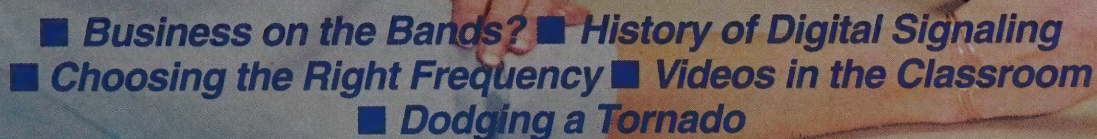


~~\$2.00 US~~

November 1991

Volume 1 Number 6



Get Your Family Licensed

Communicate with your family via ham radio.

by Don Stoner, W6TNS

I've tried for years to convince my wife that she should get a ham license. I used every trick in the book: "We need to communicate more;" "You could understand me better if you were a ham too;" "Look at all the people you would meet and new friends you could relate to." Nothing worked for 40 years!

Her standard response was, "I just can't learn the code, and besides, it's a silly way to talk." My rebuttal was half-hearted, I'm afraid. I had to admit that I didn't really enjoy Morse myself.

NO MORE EXCUSES!

Then, in February 1991, the FCC called her bluff. They created a new license class that did not require any code knowledge or proficiency. I explained that she didn't need to know a dit from a dah. All she had to do was pass a multiple choice written test. What could be easier? People are earning their ham license as never before—but not my bride! She still resisted my justifications.

IS THIS YOUR SITUATION TOO?

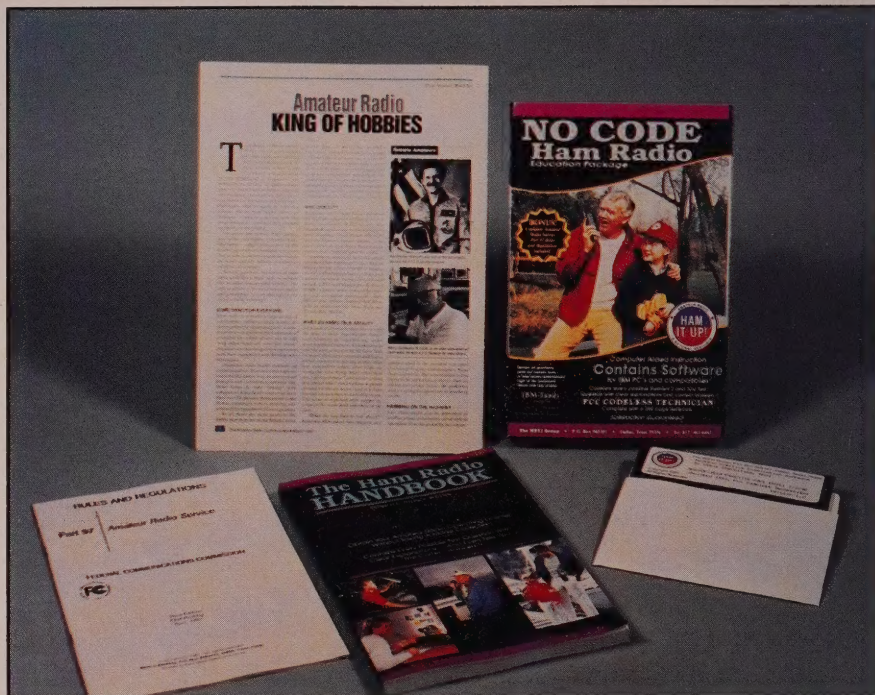
I suspect that many hams are in the same position. They would like their spouse to get a license but, like me, have approached the situation all wrong. When I started asking questions, I found that my wife didn't really like talking to strangers. And yet I was trying to convince her to get a license so she could communicate with people she didn't even know.

In the process of learning why she had resisted getting a ticket, I stumbled across her "hot button." With the breakdown of law and order in our society, she was concerned about safety for her and the children. And, with the general lack of reliability in automobiles, there was always a concern with an occasional emergency.

When I explained repeaters and how ham radio could be used to provide additional safety, I found a sympathetic ear. I showed her a borrowed hand-held that was so small it could get lost in the bottom of her purse! At last, after 40 years, she listened to my sales pitch and actually asked questions.

HOW ABOUT YOUR CHILDREN?

Teenagers know they are invincible and will live forever. Personal safety is not very high on their list of concerns. Selling the youngsters on getting an Amateur Radio license required a different tact and I found it. It's called "peer leverage."



One of my son's friends seemed curious about ham radio and asked the sort of questions that indicated a desire to get an Amateur license. I became his "elmer" and within a few weeks he took his ham test and passed. Guess who suddenly became interested in getting *his* license? Right! Within a month or so, with very little encouragement from me, my son went to the local VE group and earned his license too. Talk about peer pressure!

GET YOUR FAMILY LICENSED!

If you can convince the members of your family to get their Technician license, I've made passing the test a snap with a new publication called *The Ham Radio Handbook*. The book includes every question that might be asked on the written test and all the possible answers for each multiple choice question. My book also tells them which answer is correct along with some simplified theory to explain why.

THE DON STONER GUARANTEE

If your spouse and children can earn a ham license at all, they can do it after reading my book. I'm so sure, I'll make this guarantee. If one of your family member fails the license exam after reading *The Ham Radio Handbook*, just return everything and I'll refund the full purchase price—including postage (proof of purchase required). Anyone can pass the Technician ham test. I guarantee it!! Take advantage of my bonus education

package. I'll send the book, plus 5.25" IBM compatible software for testing your family. It will tell them when they are ready to take the test. The program displays randomly selected questions, lets one pick the correct answer and grades performance. Or, if they prefer, they can print out tests just like those that the VE's use.

The package includes a complete list of Contact Volunteer Examiners. These CVE's will be happy to tell where and when the test is being given, no matter where you live. The package has a bonus booklet which contains all the FCC Rules and Regulations on ham radio. You also receive a free copy of *The Amateur Radio Communicator*, the journal of the National Amateur Radio Association.

All this is yours if you place a free call to The National Amateur Radio Association at 1-800-GOT-2-HAM. Have your VISA or MasterCard ready. Tell the operator you want the **NARA Amateur Radio Educational Package** for \$29.95 (\$3.00 S&H) to any U.S. address. Or, if you just want *The Ham Radio Handbook*, your cost is only \$9.95 (\$2.00 S&H). If you prefer to send a check, write to the National Amateur Radio Association, 16541 Redmond Way, Suite 232, Redmond, WA 98052.

Ham radio is guaranteed to influence your life and future positively.

DO IT TODAY!!

CONTENTS

FEATURES

13 Amateur Radio Business Service?

Use Amateur Frequencies for Business?
by Fred Maia, W5YI

18 Dan and Burke

21 Changing Amateur Radio

Guest Column
by Ron Earl, W6TXK

22 W8EF OUT!

Dodging a Tornado
by William F. Blinn, N8POV

DEPARTMENTS

2 In My Opinion

Editorial, by Don Stoner, W6TNS

4 Letters

6 Touch of Class

Frequency, by Terry R. Dettman, WX7S

8 Ham Radio Outlook

Digital Signaling, by Fred Maia, W5YI

11 Teaching the Ham Class

Using Videos in the Classroom
by Gordon West, WB6NOA

ON THE COVER



Fred Osterman, N8EKU, gives a demonstration on the operation of a transceiver to his wife, Barbara. Fred operates Universal Radio in Reynoldsberg, Ohio.

The Amateur Radio Communicator

The Amateur Radio Communicator is published monthly and is the official journal of the National Amateur Radio Association (NARA), 16541 Redmond Way, Suite 232, Redmond, WA 98052.

The National Amateur Radio Association is incorporated in the State of Washington and is an exempt organization as defined in Section 501(c)(3) of the Internal Revenue Service Code.

Organization Goals

The National Amateur Radio Association is a nonprofit organization. It consists of individuals interested in the art of radio communication. The broad goal of NARA is to make Amateur Radio more widely known and to encourage more people to become involved in the Amateur Radio Service.

The organization has four specific goals within this broad framework. These are to a) publicize Amateur Radio to the general public, b) attract young people to the Amateur Radio Service, c) help existing Amateurs achieve the greatest benefit from the Amateur Radio Service and d) make Amateurs aware that our radio frequencies are in jeopardy from commercial interests.

NARA advertises in various consumer publications to create a public awareness of the Amateur Radio Service and to encourage readers to write NARA for more information. The Association also solicits authors who write on the subject of Amateur Radio in these publications. NARA has committed itself to making Amateur Radio more interesting and more accessible to all concerned.

NARA is specifically interested in encouraging young people to join our fraternity.

nity. The organization works with educators to increase awareness of the Amateur Radio Service and its value as an interesting way of educating young people. A core of young people insures continued growth of the Amateur Radio Service.

NARA believes that existing Amateurs should be more aware of the radio communication theory. Each month an article will appear in *The Amateur Radio Communicator* which discusses a technical aspect of the Amateur Radio Service.

NARA is very concerned that confiscation of frequencies assigned to the Amateur Radio Service will continue. These frequencies are a precious resource. On the other hand, there are an inadequate number of frequencies to accommodate all the new communication requirements. Amateurs must create an environment where it is more beneficial to the public to have Amateur Radio operators on these frequencies than new and emerging commercial services.

Membership and Subscriptions

Those joining NARA receive a subscription to *The Amateur Radio Communicator* for a period of one year. The combined cost of membership and magazine is \$10.00 per year in all areas with a U.S. ZIP code. The cost is \$16.00 per year in Canada and \$20.00 per year elsewhere.

The NARA membership and subscription to *The Amateur Radio Communicator* cannot be separated. Since NARA is a nonprofit corporation, the membership cost may be tax deductible. Verify this with your accountant.

It is not necessary to hold an Amateur Radio license to become a member of the National Amateur Radio Association. The only "qualification" is an interest in radio communications.

Editorial Policy

Each article and column which appears in *The Amateur Radio Communicator* is evaluated by the Editorial Board to meet a single criteria: how it contributes to NARA's educational objectives. Editorial material is intended to either (1) interest new people in becoming a Radio Amateur, (2) help existing Radio Amateurs get more out of their hobby through better understanding, (3) explain the theory behind some aspect of the service or (4) educate Amateurs on how to retain our valuable spectrum.

How To Contact NARA

The editors of *The Amateur Radio Communicator* and officers of the National Amateur Radio Association want to hear from you. Please send your questions, comments or submissions to the:

National Amateur Radio Association
16541 Redmond Way, Suite 232
Redmond, WA 98052
1-800-GOT-2-HAM (1-800-468-2426)
206-869-8052
FAX: 206-861-5780.
MCI Mailbox: NARANET3
CompuServe: 76702,753.

Editor/Publisher	Donald L. Stoner, W6TNS
General Manager	Bill Everett, K7RIE
National Coordinator	Elizabeth Tackett
Marketing	George Ure, AC7X
Technical Editor	Terry Dettmann, WX7S
News Editor	Fred Maia, W5YI
Instruction Editor	Gordon West, WB6NOA
Technical Advisor	Dan Lewis, N7NQL
Programing	Olan Hanley, KB7GIS
Publication	Patricia Meeks, KS7L
Proofing	Andressa Grosso
Finance	Lucy Heenan



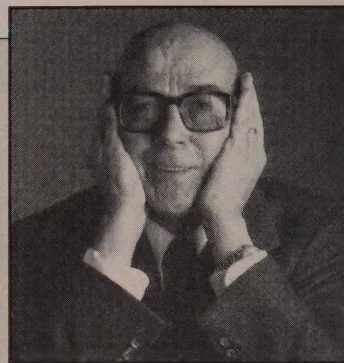
NARA

NATIONAL AMATEUR RADIO ASSOCIATION

16541 Redmond Way, Suite 232
Redmond, WA 98052

Postage has been paid at Redmond, WA and various mailing points throughout the US. Postmaster: Form 3579 is requested. Copyright 1991 by the National Amateur Radio Association. Title registered at US Patent Office. All rights reserved. This publication is printed in the USA.

NARA Versus The ARRL



Don Stoner, W6TNS

BY DON STONER, W6TNS

At each "Hamvention" where the NARA exhibits, it never fails! Questions about the relationship between NARA and the ARRL always come up when people stop by our booth.

Of course, we occasionally get the jerk who thrives on controversy and dissension. Accusations seem to bring a modicum of excitement into their drab little lives. They identify themselves immediately by making opinionated statements like "You're trying to be another ARRL!" Or "You are trying to put the League out of business!"

Mostly, however, we are visited by people who have not heard of the NARA or where we fit into the scheme of things. They generally start their conversation with a question that shows a desire to learn about us. Typical inquiries from this group are "Where did you come from?" Or simply "What's NARA?" The matter will continue to arise as more Amateurs discover the NARA, but this editorial is an effort to replace some of the heat with light.

The American Radio Relay League has been in existence for more than 75 years. Not only does the League provide Amateurs with an incredible assortment of services, but they have an outstand-

ing field organization of directors, section managers, official observers, and so on. It would be an exercise in futility to try to create an organization, from scratch, that could do what the League does for Amateurs. Even if someone had unlimited funds, they could not acquire the other necessary ingredient. That is time. There is no way to buy 75-plus years of experience.

We occasionally hear the comment that the NARA is trying to compete with the League. It usually results when people do not understand our mission. The purpose

"... Ham radio is a product, but we're not marketing it to the public."

and goals of the NARA are explained very clearly on the first page of our journal. But not everyone gets *The Amateur Radio Communicator*.

To understand the motivation, you have to know about our origin. Like most Amateurs, I was shocked when the FCC decided to reallocate a portion of the 220-MHz band. We've all heard the expression "if you don't use them, you'll lose them," with respect to our frequency allocations. No one really took the FCC seriously in this regard. Ama-

teurs provided a great service to the nation, represented a skilled pool of radio operators and we caused very few problems for the FCC. Or so we thought.

When the Commission announced the move on 220, I became curious how this could happen. I decided to investigate. It was not a pretty sight! Amateur Radio had certainly changed from that happy day in '53 when my Novice ticket arrived in the mail and I became WN6TNS. I found that the average age of a ham was 51.7 years and that less than 2 percent of the ranks were under the age of 20. Most importantly, our population was actually decreasing. In my opinion, something had to be done about this depressing situation. It was obvious we needed more hams to populate the spectrum available to Amateurs. What could be done that was not already being accomplished?

The question was answered during a meeting with Alan Dorhoffer at the offices of *CQ Magazine*. It was Alan who planted the seed that grew into NARA when he said "The problem is obvious. Ham radio is a product but we're not marketing it to the public."

He was right. I, along with many others, had overlooked the obvious. From simple beginnings, with the help of friends like Terry Dettmann, WX7S, and George Ure, AC7X, the NARA has grown to the point where it is accomplishing significant things for our fraternity.

My systolic and diastolic get a bit out of whack when people accuse the NARA of competing with the League or taking members away from them. Hey people, we didn't let the Amateur Radio Service degenerate into an old folk's hobby. We didn't ignore young people for decades, to the point where the Boy Scouts of America almost abandoned the ham radio merit badge! All this happened long before the NARA came into being. Before you "tee off" on us, ask yourself why there was a need for the NARA or why we are growing almost exponentially.

In my opinion, the reason for our growth is that we know how to market ham radio to the public better than anyone, and that includes the ARRL. I know that sounds conceited and might even be considered League-bashing, but it is neither. Let me explain. As I mentioned earlier, the ARRL provides a broad spectrum of services for Amateurs. If you have a question about communicating with Laos; contact

the League. They can tell you if it's legal or not. Have a QSL to send or receive? Send it to the ARRL QSL Bureau. They'll take care of it. The League does all this, along with a myriad of other services.

Since the League is expected to be all things to all Amateurs, it is difficult, if not impossible, to specialize in one area. It is unreasonable to expect otherwise. They could not accomplish what AMSAT has done. They could not fuel interest in digital communications like TAPR. And no one expects them to do so.

That is where the NARA comes in. We don't do any of those things for Amateurs either. We have a specific focus and that is to publicize the service, and encourage people to join our fraternity. That is all we do and we do it better than anyone else—bar none!

We believe that all Amateurs should belong to the ARRL, and we say so in our free handout, *Amateur Radio—King of Hobbies*. Whether you realize it or not, the

NARA is recruiting new members for the League. Not only is our organization focused on publicizing ham radio, but take a look at this magazine. It is written and edited primarily for the new ham and the wanna-be. By the time our members upgrade to General Class (which we encourage), members probably lose interest in the beginner end of the hobby. At that point they should be attracted to the League for additional growth and training.

I encourage you to join and support the NARA. I promise we won't use your money to put the League out of business. The next time you hear one of those jerks describing how the NARA is planning to march down the main street of Newington, sporting Uzi's loaded, cocked, and ready; read this editorial to them.

73 Don, W6TNS



(Below) Hiram Percy Maxim, co-founder of the American Radio Relay League (ARRL Photo).



MORE KUDOS

This is just a short note to inform you of the effect you had on my life. I was 22 years old in 1959 when I built your 11-meter superregenerative rig from *Popular Electronics Magazine*. Now after 32 years, I finally got my Novice/Tech license. Keep up the good work.

73,

Guy Boucher, KB9GPJ

I had always believed that you had to be an electronics whiz to become a ham operator. This belief frightened me for years. Thanks for making it simple. Got my ticket a few weeks ago and couldn't be happier. Thanks for your book. And by all means, keep it simple!

Ike Edwards, N9LZS

Enclosed is my check in the amount of \$18.00 for two (2) years membership in NARA. The last two issues of the *Communicator* (all I have seen) have certainly been interesting, and I believe they are right on course. Recent discussions with a group of hams have indicated that you should

be receiving many such applications. I hope that through your efforts, our local area will have a positive influence on the return to the basic needs of our USA as a leader in world technology and the application of our "own products."

73,

Jack Burrell, KB7ZS

■ *Comments like these really make all the work worthwhile and certainly compensate for the occasional brick thrown our way!—Ed.*

I have worked on the code for a long time, never quite getting it under control. Being 87 years old doesn't help too much! Lack of concentration is a problem. I just received the *Communicator* and enjoyed reading the ads as well as the articles.

Thanks,

Thomas W. Ball

■ *I hope my book helps you get your ticket, Thomas. By the way, you may be 87, but your handwriting is steadier and more legible than many people half your age!—Ed.*

HELP OFFERED

How's that for cheating first out of the box? Having devoured most of the sample issue that showed up in my mail box the other day, I decided to send you a check in the amount of \$25.00 for a three-year subscription.

Having been born in the northern part of Missouri, and having taught in the elementary grades of the so called school system here in the Emerald State called "Ourigan," I have a continuing yen to help any interested individual learn a few facts whenever the opportunity presents itself. I'm a complete sucker for things that I consider worthwhile.

Jules Verne Lashwell, K7HIZ
3415 Gilham Road
Eugene, OR 97401

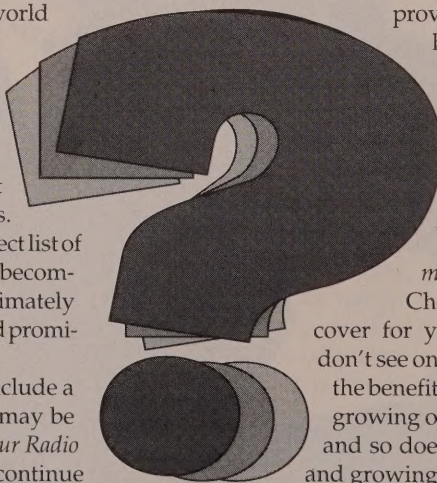
I've just seen my first issue of *The Amateur Radio Communicator*. I've been a ham since the 9th grade (29 years ago), but I've been inactive for 25 years. That is, until my two sons, Dave (11), KBØJOW and Andy (9), KBØJEL, got their Novice licenses as a technological spin-off of a home

HOW DID I GET THIS MAGAZINE?

One of the ways we can tell the world about the goals and ambitions of the National Amateur Radio Association is to supply complimentary copies to non-Amateurs. We send copies of each issue to hobby shops and science centers, and about 6,000 pieces to newly licensed hams.

This magazine is also mailed to a select list of people who might be interested in becoming Amateurs. We also send approximately 10,000 copies to NARA members and prominent people in Amateur Radio.

If your mailing label does not include a NARA membership number, this may be your last or only copy of *The Amateur Radio Communicator*. We would like to continue



providing you with this informative publication each month, but we can only do so if you are a member. For those interested in becoming a ham, or who are newly licensed, a membership in NARA represents an outstanding bargain. A membership, which includes 12 issues of *The Amateur Radio Communicator*, is only \$10.00 per year.

Check the mailing label on the back cover for your membership number. If you don't see one, look up about six inches and read the benefits of becoming a member of this fast-growing organization. We need your support and so does ham radio. Help us get it "going and growing!"

schooling program. The editorial in the June/July '91 issue touches on something of great interest to me as a scientist (now in internal medicine, with an undergrad degree in electrical engineering), and father of two boys with good minds. I heartily agree with you. We are indeed in a mess! Keep up what you've set out to do!

It has occurred to me that I might set up some educational experiments with entertainment value with which I might travel to area schools to help science teachers introduce young people to the wonders of science. Do you or your readers have any ideas or books to which I might be directed?

Enclosed is my check for a subscription. I'm very pleased with your magazine, as are Dave and Andy.

Sincerely,

A.E. 'Chip' Schmidt, WA0CWG
2024 Hilton Drive
Cedar Falls, IA 50613

P.S. I have a sliderule and plan to show the boys how to use it!

NO-CODE CLASSES IN FLORIDA

I have enclosed two flyers on our No-Code Tech and Novice Class to commence October 16th. Our club has offered classes for the past 18 years, and from experience we expect a turnout of 40 to 50 people. Any handout material you would care to offer would be appreciated.

Thank you,

Peter J. Saglio, KB4NSA
Hollywood Amateur Radio Club
P.O. Box 6306
Hollywood FL 33021

ANOTHER VIEW

Like most of the uninformed, Stoner fails to take into account that in Japan, Britain, Singapore, Germany, Hong Kong, or anywhere else with the possible exception of Canada, only the elite who can pass the next

qualifying test can continue going to school while we force everyone under 18 to go to school. If you wish to compare, compare the top 15 percent in a public high school in the US with the top 15 percent in a foreign high school. Also permit me to say that our system of educating everyone is responsible for the continuation of our particular form of economic democracy. In most of the places you mention in your editorial, there is a 15 percent upper class and the rest are just able to eat. There is no middle class. I retired from the USN and then taught high school for 20 years. I have spent 9 years in the Orient and 10 years in Europe. You are not qualified to write on the problems of American Education and I can tell you that most of your statements tend to be pure untruth. It is unfortunate that folks will read and accept your pap.

Gradon A. Lewis, N7FCO

■ *While I acknowledge your argument Gradon, I must say you are out of step with the majority of educators in this country. Economic democracy? Ever hear of the savings and loan scandal, kiting checks in Congress, or the homeless in Seattle? By the end of this decade, the economic capital of the world will not be in New York but in Tokyo.—Ed.*

DANGLING QUESTIONS

Congratulations on the *Communicator*! A breath of fresh air! Here is my \$10.00 to keep it going. Your article on the dipole antenna is good as far as it goes. But it's not complete. You failed to describe the method of connecting the coaxial cable to the wire, what type of unit, where obtained, etc. Don't leave questions dangling.

Sincerely,

Leon Rovick

■ *You are right Leon, but Terry Dettmann's article was directed to answering the questions on the dipole presented in the question pool. It was not meant as a complete article on the dipole. However, I certainly would like to get a good, simple article on antennas and how they work. Any takers?—Ed.*

DRIVEN A FORD LATELY?

Have you driven a Ford lately? Come on, get with the times. American auto industry may not be as good as it *will be*, but we're getting there at an incredible rate. Put the 70's behind you as we have. Take your foreign car down and trade it in on a good American-built car and start being an American again. Then start writing the truth. The auto industry is the one bright spot in American industry as far as quality is concerned. Consider other industries and you will see that we are leading the way back to American pride and craftsmanship. Meanwhile, keep your magazine that is geared toward a license class whose quality standard is yet to be determined. By the way, since you seem to believe that anyone who drives an American car is "patriotic and gullible," perhaps it is reasonable to assume that those of you who drive Japanese cars (as I'm sure you must) are uninformed and unpatriotic.

WK9G

■ *Well now, perhaps you can explain to us why there are only three American cars out of the top 10 cars in consumer satisfaction, according to Consumer Report and J.D. Powers—the folks who tabulate this sort of thing. The rest are German or Japanese. This is absolutely shameful for the nation that practically invented the automobile and mass production. What do I drive? A 1965 Mercedes 220SE—Ed.* □

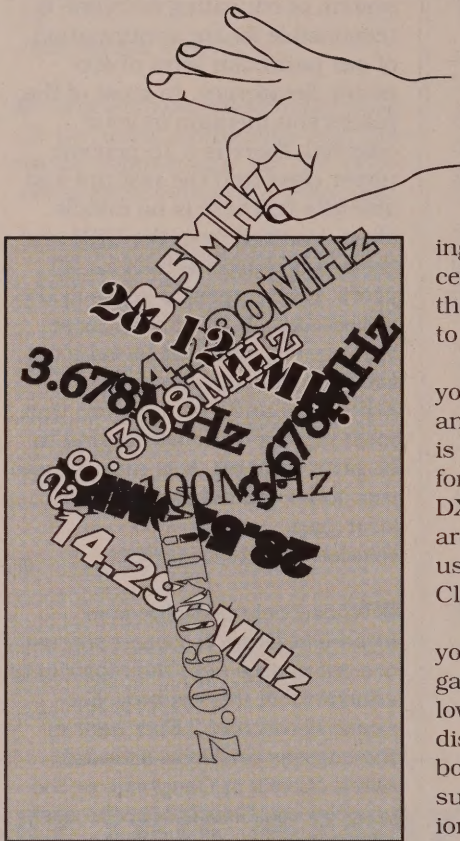
Choosing an Operating Frequency

BY TERRY R. DETTMANN, WX7S

Operating procedures are important topics for Amateur Radio. The Amateur Radio Service has been largely self-policing. There are no Draconian FCC police out there enforcing operating procedures. The FCC does monitor Amateur Radio, but its resources are small and it cannot pursue everyone or everything. The Commission's policy is to keep hands off as long as we continue to police ourselves. This privilege can be lost! Bad operators and poor operation, if they lead to enough complaints, can result in greater regulation and enforcement or even worse, completely unusable operating bands.

Good operating procedure is mostly just common sense. It also involves a healthy dose of courtesy and reasonable experience at good versus bad operating. You will gain experience as you start operating. But you should know some of the lessons Amateurs have learned over the years about the best way to do things. It is called good operating procedure.

Good operating procedure is often arbitrary (send CQ 3 times instead of 6 for example). There are reasons that people will give you for each choice, but even those are



rationalizations. The ultimate reason for most of these procedures is that they work and are agreed upon by most Amateur Radio operators.

Correctly choosing a transmitting frequency is necessary to make everything work when you are trying to contact other amateurs. The frequency selection needs to be one that is consistent with your equipment, antenna, license, and what you hope to accomplish. As an Amateur Radio operator, you have a wide range of frequencies available. So how do you choose between them?

You made part of that choice when you bought your gear and antenna. If your antenna is cut for 10 meters, you should not be us-

ing it on 80 meters. If your transceiver works on 10 and 15 meters, then you should not expect to try to work someone on 80 meters.

Your Novice license also restricts you. For example, 20 meters is not an authorized band for Novices. It is one of the most productive bands for people working on awards like DXCC (working over 100 countries around the world), but you cannot use it until you upgrade to General Class or higher.

More restrictions are placed on you because of propagation. Propagation is the phenomena that allows radio signals to traverse a long distance. Long range signals are bounced off that charged layer that surrounds the earth, called the ionosphere. Your signals have to be chosen to match the state of the ionosphere. During periods of high sunspot activity, 10 meters is good around the world. It is an incredibly productive band. However, when the sunspot cycle drops down to a low (every 11 years), you probably will not be able to get anyone out of the local area with 10 meters. If you are a Novice, or upgrade to Tech-Plus, you can operate on 10 meters.

Finally, there is the subject of courtesy. If someone is using the frequency, do not try to jump on it. Amateur Radio bands are continuous sets of frequencies. You can select another frequency, clear of operation before you start transmitting. It is important to listen before you transmit. Go further still

by tuning your transmitter into a dummy load to minimize the amount of time on-the-air that you will need to tune up.

- 1** What is the most important factor to consider when selecting a transmitting frequency within your authorized subband?
 - A The frequency should not be in use by other amateurs.
 - B You should be able to hear other stations on the frequency to ensure that someone will be able to hear you.
 - C Your antenna should be resonant at the selected frequency.
 - D You should ensure that the SWR on the antenna feed line is high enough at the selected frequency.

The correct answer is "A." Answers B, C, and D are secondary to making sure the frequency is clear be-

fore you transmit. It is common courtesy and good sense.

- 2** You wish to contact an Amateur Radio station more than 1500 miles away on a summer afternoon. Which band is most likely to provide a successful contact?
 - A The 80- or 40-meter bands.
 - B The 40- or 15-meter bands.
 - C The 15- or 10-meter bands.
 - D The 1.25- or 23-centimeter bands.

The correct answer is "C." The 80- and 40-meter bands are primarily night bands for this type of distance. They are fine after dark, but usually not during the day. Although during a low in the sunspot cycle, the 10-meter band will not get that far either. 1.25- and 23-centimeter bands are primarily line of sight. These signals do not follow the curvature of the earth. They

wind up somewhere out in space; hundreds of miles above the antenna of a distant station.

- 3** How can on-the-air transmitter tune-up be kept as short as possible?
 - A By using a random wire antenna.
 - B By tuning up on 40 meters first, then switching to the desired band.
 - C By tuning the transmitter into a dummy load.
 - D By using twin lead instead of coaxial-cable feed lines.

The correct answer is "C." With today's modern transceivers, tune-up is less of a problem than it used to be. In many cases you do not have to tune any knobs at all. If it is necessary, use a dummy load first to get things set up before you transmit.

Good operating procedure involves a lot of courtesy; it is important to our future as a radio service. More next time. □

AUTHORIZED FREQUENCY BANDS - AMATEUR SERVICE

(for U.S. Amateur Stations operating from ITU-Region 2-North and South America)

Meters	Novice	Technician	Technician Plus	General	Advanced	Extra Class
160				1800-2000 kHz/All	1800-2000 kHz/All	1800-2000 kHz/All
80	3675-3725 kHz/CW		3675-3725 kHz/CW	3525-3750 kHz/CW 3850-4000 kHz/Ph	3525-3750 kHz/CW 3775-4000 kHz/Ph	3500-4000 kHz/CW 3750-4000 kHz/Ph
40	7100-7150 kHz/CW		7100-7150 kHz/CW	7025-7150 kHz/CW 7225-7300 kHz/Ph	7025-7300 kHz/CW 7150-7300 kHz/Ph	7000-7300 kHz/CW 7150-7300 kHz/Ph
30				10.1-10.15 MHz/CW	10.1-10.15 MHz/CW	10.1-10.15 MHz/CW
20				14.025-14.15 MHz/CW 14.225-14.35 MHz/Ph	14.025-14.15 MHz/CW 14.175-14.35 MHz/Ph	14.0-14.35 MHz/CW 14.15-14.35 MHz/Ph
15	21.1-21.2 MHz/CW		21.1-21.2 MHz/CW	21.025-21.2 MHz/CW 21.3-21.45 MHz/Ph	21.025-21.2 MHz/CW 21.225-21.45 MHz/Ph	21.0-21.45 MHz/CW 21.2-21.45 MHz/Ph
12				24.89-24.99 MHz/CW 24.93-24.99 MHz/Ph	24.89-24.99 MHz/CW 24.93-24.99 MHz/Ph	24.89-24.99 MHz/CW 24.93-24.99 MHz/Ph
10	28.1-28.5 MHz/CW 28.3-28.5 MHz/Ph		28.1-28.5 MHz/CW 28.3-28.5 MHz/Ph	28.0-29.7 MHz/CW 28.3-29.7 MHz/Ph	28.0-29.7 MHz/CW 28.3-29.7 MHz/Ph	28.0-29.7 MHz/CW 28.3-29.7 MHz/Ph
6		50-54 MHz/CW 50.1-54 MHz/Ph	50-54 MHz/CW 50.1-54 MHz/Ph	50-54 MHz/CW 50.1-54 MHz/Ph	50-54 MHz/CW 50.1-54 MHz/Ph	50-54 MHz/CW 50.1-54 MHz/Ph
2		144-148 MHz/CW 144.1-148 MHz/All	144-148 MHz/CW 144.1-148 MHz/All	144-148 MHz/CW 144.1-148 MHz/All	144-148 MHz/CW 144.1-148 MHz/All	144-148 MHz/CW 144.1-148 MHz/All
*1.25	222.1-223.91 MHz/All	220-225 MHz/All	220-225 MHz/All	220-225 MHz/All	220-225 MHz/All	220-225 MHz/All
0.70		420-450 MHz/All	420-450 MHz/All	420-450 MHz/All	420-450 MHz/All	420-450 MHz/All
0.35		902-928 MHz/All	902-928 MHz/All	902-928 MHz/All	902-928 MHz/All	902-928 MHz/All
0.23	1270-1295 MHz/All	1240-1300 MHz/All	1240-1300 MHz/All	1240-1300 MHz/All	1240-1300 MHz/All	1240-1300 MHz/All

Chart from Gordon West's Technician Class book *New No-Code*.

Morse Code

The World's First Digital Signaling

BY FREDERICK O. MAIA, W5YI

Conveying messages digitally is the oldest form of communication. Analog signaling has been with us for only a relatively short time. Analog communication is a system in which an electrical signal varies in frequency or magnitude and has an infinite number of states. These variations are read by a device that converts the received energy into a form that can be understood by a machine or a human.

A digital circuit operates like a switch—it has only two states, either on or off. There are two digits in a binary digital system. Combinations of these two “anythings” are clustered to form messages. This is the basis for Morse code—a signal or no-signal.

From the beginning of history, men have struggled with the dilemma of communicating between a great distance. Among the earliest primitive people, fire and smoke signals were used. The inhabitants of some areas of Africa signaled with jungle drums. Signals such as these were used for centuries. All have played a part in the evolution of communications as we know it today and are really a form of digital communications.

Historically, man's first recorded attempt at distance communication dates back some 3,000 years or more to the construction of a fire

beacon. This beacon signaled to the Greek army that Ulysses and his men, who had entered Troy in the belly of a wooden horse, had opened the gates of Troy.

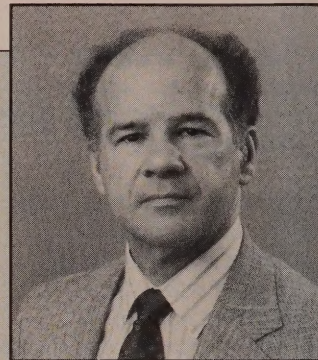
The great historian Herodotus tells that in 4000 BC a reflected signal was sent from Athens to Marathon (about 25 miles) by means of sunlight reflected from a soldier's highly polished shield. In 300 BC a reflecting mirror of burnished metal was used as a light-house in Alexandria for the purpose of signaling to ships at sea. In the Bible, (Jeremiah 6:1), signal flares were used near Bethlehem.

In England, communications by means of signal lights and fire beacons were widely used throughout the country through the time of Queen Elizabeth (1600).

Later, America had its own beacon light made famous by Longfellow in his immortal poem “Paul Revere's Ride.”

*He said to his friend, 'If the
British march
By land or sea from the
town tonight
Hang a lantern aloft in the
belfry arch
Of the North Church tower as
a signal light
One if by Land, and two if
by sea.'*

Later, and for many years to follow, the U.S. Army used heliograph signaling. This word comes from the Greek ‘helio’ meaning sun and ‘graph’ meaning to write. So heliograph means literally to write by the sun. The Army Signal Corps



Fred Maia, W5YI

transmitted a signal by heliograph (the cutting on and off of the sun's rays) from one mountain peak to another over a distance of 215 miles—a truly unbelievable feat in those days.

In the 18th Century shortly before the French Revolution, a new system of communication was devised. It was called ‘semaphore.’ Interestingly it was the result of a prank where schoolboys in two nearby schools devised a system so that they could send messages back and forth. The word ‘semaphore’ comes from the Greek ‘sema’ meaning a sign, and ‘pherin’ meaning to bear. Therefore, semaphore literally means to bear a sign.

The French government immediately applied the semaphore system to military signaling. In their system, towers were built every five miles or so. On top of each tower was a semaphore consisting of a mast containing two movable arms, similar to our railroad semaphores. Semaphore communication was later used between ships; sailors would send messages by waving flags—each different position had a meaning.

Following the semaphore, there were many other methods of signaling; flags, colored lights, and many variations of these. Most were short-lived. Even birds (carrier pigeons) were used to carry important messages during times of war.

Until this time, all wireless communications were accomplished by optical or auditory systems that depended upon the ability of being seen or heard for their success. It is interesting to note that these sig-

nal systems were used for distance communication during 95 percent of the time recorded by civilization. It is only in the century following that of the beacon light and the semaphore that we come to the era that applies electricity to communications.

ELECTRICAL DIGITAL SIGNALING

The electric telegraph is considered to have had its beginnings in the mid-1700's when a system of horizontal wires was electrostatically induced to pick up bits of paper marked with letters of the alphabet. This was nearly a century before Samuel Morse sent his first message via his telegraph.

Electrochemical telegraphy made its appearance in 1800. One system had 35 wires running to a receiver—that was a water tank. When electricity was applied to one of the 35 wires, hydrogen bubbles signifying a particular letter rose from the wire in the bottom of the tank.

Around 1820, the Danish scientist Oersted found that electric current could produce a deflection of a magnet placed near it. For the first time, electricity had exerted force. In 1825, this new knowledge was applied to telegraphy by Baron Schilling in Munich. He devised a magnetic telegraph in which letters were indicated by movements of a needle over the white or black segments of a card.

In Schilling's alphabet, "A" was black, white; "B" was black, black, black; "C" was black, white, white—and so on. Here, at last was the basis of a really practical telegraph and the time was now ripe for its exploitation. Its use occurred almost simultaneously in America and England.

In 1836, W. F. Cooke (an English medical student) abandoned his intended profession and teamed up with Charles Wheatstone, professor of physics at King's College, London. Cooke and Wheatstone produced their first telegraph patent in June 1837. They carried out their

first practical trials that same year over a quarter of a mile line between two London railway stations. The receivers they used were called "needle instruments." Letters were indicated by the deflection to the right or left of vertical pointers. The system was slow, but messages could be sent and read by unskilled staff.

Cooke and Wheatstone continued to improve their telegraph, finally reducing the number of needles to a single one. In 1846, they formed the Electric Telegraph Company, and by 1852 it was estimated that there were 4,000 miles of telegraph lines in England.

For a long time, railways and telegraphs went hand in hand. Railway, the new means of transportation, could not have operated without some form of communication. Within a very few years, steel rails and copper wires had spread their networks over much of Europe. Cooke and Wheatstone netted fortunes in royalties.

While all of this was going on in England, in the United States, a mildly talented portrait painter named Samuel F. B. Morse heard about the possibilities of electrical communication. The concept immediately fired his mind.

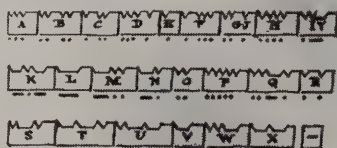
SAMUEL MORSE AND HIS FAMOUS CODE

Morse's idea was to use the passage of an electric current through an electromagnet to deflect a pen or pencil so that it could mark a strip of paper passing underneath. The mechanical telegraph was improved and the famous Morse code was devised by assigning the simplest combinations to those letters of the alphabet that were most frequently found in the type cases of a local printer.

Samuel Morse's first idea of a telegraphic code was to use a dictionary of words; giving each word a numerical reference. Thus, only ten individual characters (one through zero) would be necessary. It became apparent that a very long list of words with numerical references would be needed, and the time necessary to translate messages would be excessive. The first complete dot/dash alphabet/number code was completed in 1838. In 1844, the alphabet was changed to its present day commercial version. It was not until 1854 that the code that we use as ham operators was fully completed.

The beauty of Morse's system is its simplicity. It is so simple that we tend to take it for granted and

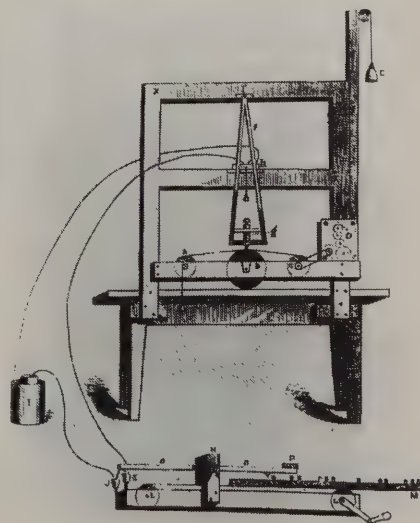
The following is the form of the type, and the code, as drawn in the summer of 1837.



The changes from this original arrangement of the dots, lines, and lines, are shown in the accompanying table.

As in the present	Q	U	W	Y
B	R	V	X	Z
C	S			
D	T			
E	L			
F	M			
G	N			
H	O			
I	P			
J				
K				
L				
M				
N				
O				

Morse's saw-tooth type and first alphabet code, 1837.



Morse's first sender (from an illustration in *Les Merveilles de la Science*, circa, 1866).

forget that someone had to invent it. Earlier telegraph systems had involved many wires and cumbersome sending and receiving apparatuses. Morse produced a telegraph that needed only one wire (the earth providing a return circuit) and whose transmitter was nothing more than a key to make and break the connection. Using the dot-dash code, this simple key could send any letter or combinations of letters.

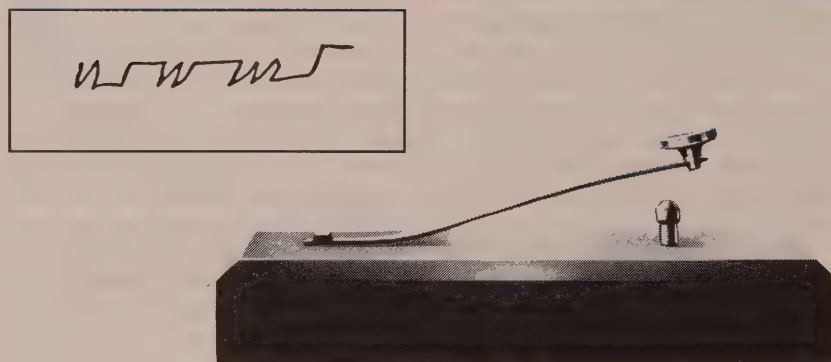
The first receiver Morse built consisted of a magnet-operated pen writing jiggles on a moving tape. It was soon discovered that the ear could interpret the long and short buzzes, and the Morse sounder

came into general use. It survives; virtually unchanged to this day.

Until this year, every person that has ever been licensed as a ham operator has had to learn the Morse code. It really is not very difficult. Telegraphy knowledge is still required before you may operate on the long distance short-wave HF bands. In the next issue we will cover the fundamentals of learning the Morse code. It is really quite easy to do!

See you next month.
Fred, W5YI

Fred Maia, W5YI
National Volunteer Examiner Coordinator
P.O. Box 565101
Dallas, Texas 75356



THE W5YI-VEC

The **W5YI-VEC** is a very large organization of Amateur Radio operators who periodically conduct ham license examinations in most large cities across the country. The W5YI Group also distributes most commercially available license study material; both for the Morse code and written tests. They may be reached at 1-800-669-9594 during regular business hours.

The W5YI-VEC is always on the lookout for Advanced and Extra Class level Amateurs who would like to assist the ham radio hobby grow by conducting periodic license examinations. Let us know if you are an Advanced or Extra Class level Amateur and wish to participate in our testing program. You may request a VE application by writing:
W5YI-VEC
P.O. Box 565101
Dallas, Texas 75356.

40 JOURNAL OF THE TELEGRAPH [March 30, 1887]

THE "VICTOR" VICTORIOUS!

THE FASTEST TIME IN THE WORLD.

All Previous Records Broken

500 Words, 2,368 Characters, sent in 10 Min. 32 Sec.

TELEGRAPHERS' TOURNAMENT

In New York, on April 5, 1885.

LIVE MEN WANT LIVE KEYS!

We have had an essay to prove that the Improved Victor Key is the best in the world. The result is that the Improved Victor Key is the best in the world. The result is that the Improved Victor Key is the best in the world.

L. G. TILLOTSON & CO., Nos. 5 & 7 Day St., New York.

THE HOME LEARNER'S OUTFIT

BEWARE OF COUNTERFEITS!!

Price, \$3.75

Price, \$3.75

L. G. TILLOTSON & CO.,
Mfrs. and Dealers in TELEGRAPH AND TELEPHONE SUPPLIES OF EVERY DESCRIPTION,
Nos. 5 & 7 DAY STREET, NEW YORK.

41 JOURNAL OF THE TELEGRAPH [June 30, 1887]

SOMETHING NEW!

THE "SNAPPER KEY."

A complete set of Telegraph Instruments without a battery, that can be carried in the pocket.

SENT BY MAIL ON RECEIPT OF PRICE, \$1.00.

THE IMPROVED "SNAPPER" SOUNDER.

A Compact Pocket Telegraph Instrument, Made in 3 Styles.

Price, \$3.50.

CONKLIN'S PRIVATE LINE OR LEARNER'S SET.

Price, \$3.75.

The Empire Electrical M'g Co.,
27 TO 35 WALWORTH STREET, BROOKLYN, N. Y.

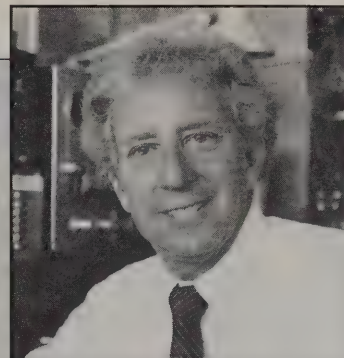
(Upper left in box)
Reading from
Morse's first self-
recording register.
(From Samuel F.B.
Morse, his letters and
journals, by E.L. Morse,
1914.)

(Upper left) First
form of key. (From
Morse's notebook.)

(Left) A selection of
advertisements from
the Journal of the
Telegraph 1886-7.

Illustrations courtesy of
Practical Wireless Magazine
(Introducing Morse, ©1985).

Using Videos in the Classroom



Gordon West, WB6NOA

BY GORDON WEST, WB6NOA

Thank goodness for videotapes! Just a few years ago, ham radio instructors had to use hard-to-see slides, overhead projections, and 16mm presentations of Amateur Radio theory, and ham radio operators in action.

I would usually begin my first class session with the 16mm film, *The World of Amateur Radio*. It is one of the best produced films I have ever seen about getting new students excited about the Amateur Radio service. By the way, if anyone still has one of those 16mm films hanging around the classroom, I could sure use a replacement!

Videotape is an excellent way to bring ham radio training into the classroom. The ideal classroom should have multiple color monitors so that every student gets a close look at what is on the video screen. A little color monitor way up in the front of the classroom does not work if you have a class of 50 people. The new "rabbit" type of video transmitters make it easy to run a couple of video screens simultaneously. Additional monitors assure that everyone can get a close look at what is being shown.

The American Radio Relay League has the best videotape library. You must be a registered ARRL instructor to take advantage



of their library, or you must be affiliated with a club or be an ARRL member to check out a specific videotape. The tapes are free, except return shipping.

The booking of an ARRL video is on a first-come, first-served basis. Programs may not be shown for financial gain. As long as you are not teaching a ham class for profit, an ARRL video can be checked out.

You must make your request for an ARRL video on ARRL Form CT-20. Specify V for VHS, or U for 3/4-inch U-Matic. They will ship you one videotape per month, but you should list two or three alternatives or dates on each form. You are requested to return the programs within 48 hours after showing because there is such a big demand for the videotapes in the ARRL library.

The League is constantly updating their video library. They even

have color slides. Soon they may even have a full selection of transparencies similar to what is seen in the ARRL instructor's notebook.

Here is a list of some popular ARRL videos available to registered instructors for free loan:

- VT-4 *AMSAT show with narration*
- VT-20 *All About Wire Antennas*
- VT-21 *Amateur Radio Television in Europe*
- VT-26 *Amateur Radio Disaster Program*
- VT-28 *Amateur Radio Direction-Finding in China*
- VT-30 *Amateur Radio's Newest Frontier, Space Shuttle video*
- VT-32 *Northern Lights and the Aurora Borealis*
- VT-33 *Astronaut W5LFL Talks about the Space Shuttle*
- VT-34 *Tornado video*



- VT-35 *Hurricane video*
- VT-36 *Shuttle Amateur Radio Experiment*
- VT-37 *Packet Radio Primer*
- VT-38 *Surviving the Cold*
- VT-40 *New world of Amateur Radio*
- VT-50 *What are those crazy-sounding signals?*
- VT-52 *Disaster Drill: The Big One*
- VT-53 *Amateur Television*
- VT-54 *Amateur Radio in the Schools*
- VT-56 *Making Contacts, and Making Friends*
- VT-57 *Satellite Communications*
- VT-58 *Field Day*
- VT-59 *Correction of TVI*

Most of these videos run about 30 minutes. All are excellent presentations to motivate your students to stay in the class and earn their ticket. While the League is sent countless numbers of videotapes for consideration, this is the "cream of the crop" when it comes to professionally executed programs.

If you are teaching an upgrade class, your students might be interested in DXpedition videos. For a list of videos, they can write to: J. Clarke, WB6ZUC, 207. Evergreen,

Kentfield, California 94904. A self-addressed stamped envelope would be appreciated.

There is a new video soon to be produced by the American Radio Relay League and AMSAT, telling the story of hams in space. Roy Neal, K6DUE, Executive Director, says, "We plan to make a series of video tapes with a working title, *Hams in Space*. As currently envisioned, there will be five chapters in this video with each chapter running five to six minutes. As an educational tool, the video can be played in sequence or played individually.

"Over the past decade, we have turned out such well-known videos as *Amateur Radio's Newest Frontier*, *Sarex—The Shuttle Amateur Radio Experiment*, and the award-winning *The New World of Amateur Radio*. We feel that this new video will complete the series and provide the Amateur Radio instructor a new and powerful tool with which to show the world our hobby," adds Roy Neal.

You can be assured that if it has credits to Bill Pasternak, Frosty Oden, or Roy Neal, it is going to be a great video tape for your classroom. I hope you enjoy using vid-

Videos are great for big classes, but only if you have a big-screen TV or multiple monitors.

eos in the classroom as much as I do!

73, Gordon, WB6NOA



CQ ALL SCHOOLS ON THE AIR

Every Tuesday and Thursday morning, at approximately 1800 hours UTC, Carole Perry, WB2MGP, and Gordon West, WB6NOA, go on the air with the 10-meter CQ ALL SCHOOLS net at 28.303 MHz. If you are teaching a day class, or teaching in the school systems be sure to tune in. Join Carole and Gordo for a lively classroom-to-classroom contact. Prepare to QSY up the band as soon as you make contact with another classroom on the air.

UP TO THE MINUTE NEWS FROM THE WORLD OF AMATEUR RADIO,
PERSONAL COMPUTING AND EMERGING ELECTRONICS.

AMATEUR RADIO BUSINESS\$ SERVICE?

FROM THE W5YI REPORT

In response to discussions with ARRL officials and a letter from a Michigan Amateur, the FCC suggested changes to the "no-business rule" that could have enormous impact on the Amateur Service.

Among other changes, the proposal would allow hams to conduct personal and club business over Amateur frequencies; to make increased use of Amateur spectrum by or for local governments, nonprofits and the news media, and would permit payment of teachers to operate Amateur stations. Even the long sought after permission to "order pizza" on the air would be granted.

Amateurs now provide some communications for others. But they are supposed to refrain from providing regular organizational or business communications for which landline telephone or cellular systems, business radio frequencies or other services are available. Amateur safety-of-life communications support is permitted, but should stop when the emergency is over and when other radio services should be used—even if the other services would cost money to use.

Those traditional policies would end under the new proposal. The

**FCC
"BOMBSHELL"
WOULD
ALTER
"NO-BUSINESS
RULE"**

FCC has suggested that the League file a Petition for Rulemaking to begin the changes.

Key to the concept is that Amateur Radio is supposed to have "excess capacity" (more spectrum than it needs) and that extra capacity could be opened up for non-Amateur or quasi-Amateur use. Emergencies would continue to take priority. Regular Amateur communications would be classified into nine categories and non-Amateur communications would take a secondary status.

The suggested changes are intended to reduce the pressure on the FCC from some net, bulletin and phone-patch operators, "swap shops," volunteer groups, marathon organizers, missionaries and organizations who want more liberal rules about what communications are permitted. The lobbying, letter writing and Congressional inquiries on this subject seem to be hav-

ing an effect. The changes could transform Amateur Radio into more of a "Personal and Business Radio Service."

FILING ARRL REPORTS BY PACKET

Kim Nothelfer (call sign unknown) of Saginaw, Michigan, asked the FCC about filing ARRL Field Organization reports over Amateur packet radio. "The report that I am referring to is called the FSD 212," Nothelfer wrote. "It tells the League how many people are available for vol-

unteer emergency service. Their explanation to me is that it is OK to do so as long as the collected information is mailed to the League and not sent via Amateur Radio.

"If this is not all right to do, then would it be OK to send the information from one volunteer to another, the information accumulated, and not sent to the League, but kept in our state with our emergency coordinator? This would be from one volunteer to another and never sent to the League.

"I understand that you cannot go so far as to make a list of the do's and don'ts of Amateur Radio. However, we look to you for clarification on this matter. "... Also, we have to look at the new hams who are coming into packet radio due to the no-code license. I am sure there will be some confusion on their part and we need to help them get started without conflict between the League and 97.113.11.

THE FCC REPLIED, IN PART—

"Section SS97.113(a) specifically prohibits an Amateur station from transmitting any communication the purpose of which is to facilitate the business or commercial affairs of any party." "...The term 'business' in this instance, is used in the broadest context. It includes all types of communications that are intended to facilitate the regular business or commercial affairs of any party, whether individual or organization, whether for profit or not-for-profit, whether charitable or commercial, or whether government or non-government. "...In your case, if Amateur Service frequencies are used to facilitate the collection or reporting of information for the ARRL, then the Amateur Service is being used to facilitate the regular business or commercial affairs of the ARRL. The use of the Amateur Service to transmit this information is prohibited by Section SS97.113(a) of the Commission's Rules."

LETTER KICKED OFF DISCUSSIONS

We understand that the Nothelfer letter kicked off a series of meetings between the ARRL and the Commission about the business rule. The result of those meetings was revealed in a speech given by FCC Private Radio Bureau chief Ralph Haller, N4RH, to the ARRL National Convention in Saginaw, Michigan, August 24th. Here are the remarks of N4RH: "We can't help but be impressed with the pioneering work you are doing with your new high-speed systems. Not only are you able to accommodate the influx of new operators, but it appears from what you are telling us, you have an excess capacity."

"We understand from your letters and phone calls that you are anxious that your excess capacity be used to help alleviate the demands being placed on the maritime frequencies, the common carriers, the public safety frequencies, the government systems, the business frequencies, and so on.

"The existing absolutely-no-business rule, unfortunately, often stands in the way of your helping out. Its well-meaning purpose is to help preserve the character of the Amateur Service. It is a device to prevent the exploitation of the Amateur Service. It does, with all the subtlety of a meat axe!

"We know that it is an unpopular rule within the Amateur community. Quite frankly, we have always been more than a little uncomfortable with it. As frequency managers, we feel overly bureaucratic when we have to tell you that you must not use your unused Amateur Service frequencies for non-Amateur purposes.

"After all, the real anti-exploitation rules are rooted in your respect for the principles for which your frequencies are made available to you, and by your good judgement."

Slide shown by N4RH

Non-Amateur Communications

Suggestions Based on Requests

- Secondary Usage
- Parade logistic support
- Nonprofit organizations
- Government agencies
- Public safety agencies
- Classroom instruction
- Sell apparatus
- News media information
- Club business
- Personal business
- NOAA, WWV, etc.
- Other?

"We have suggested to your League Officers, therefore, that they consider the possibility of asking for rule making to allow your excess capacity to be used on a secondary basis for certain non-Amateur communications.

"This catalog was compiled from your letters and phone calls over the years asking for permission to use the Amateur Service frequencies for non-Amateur communications.

"Obviously, your non-Amateur communications would have to be limited to only those areas where

the FCC regulates communications because of the prohibitions in the International Regulations. Domestically, however, you might use your frequencies to provide logistical support for a parade, race, marathon, or similar gathering.

"You might provide communication assistance to a non-profit organization, charitable organization, or public-safety agency.

"You might participate more fully in governmental systems like Skywarn.

"You might help provide classroom instruction in schools.

"You might sell or trade to Amateur operators electronic apparatus.

"You might provide information to your magazines and newsletters.

"You might conduct your radio club business over the air.

"You might conduct your personal business, including ordering pizzas.

"You might provide information to the news media, including broadcast stations, newspapers and magazines.

"You might also rebroadcast the programs from other stations like the NOAA weather, Voice of America and WWV.

Slide

Precedence Amateur Service Frequency Usage Suggestion Based on Section 97.101

PRIORITY

Providing emergency communications

PRIMARY

Conducting Amateur communications

SECONDARY

Conducting non-Amateur communications

"Providing emergency communications would continue to have the top precedence. The primary usage of your frequencies, moreover, would continue to be your regular Amateur Service communications. When, and only when, those two traditional usages are insufficient to completely occupy your bands, the unused frequencies would be available to you on a secondary,

non-interference basis, to carry on non-Amateur Service communications."

Slide

Providing Emergency Communications From Part 97, Subpart E

- Operation during a disaster
- Safety of life
- Protection of property
- Station in distress
- RACES (except drills)

"The number one priority is covered by Subpart E in your rule Part 97. For some 42 years, providing emergency communications has been at the very top of the list of purposes of the Amateur Service in the United States. There would be no changes in these rules."

Slide

Amateur Service Communications Primary Usage From Section SS97.503(c) Rules

- Station operating procedures
- Radio wave propagation
- Amateur Radio practices
- Electrical principles
- Practical circuits
- Components
- Signals and emissions
- Antennas and feed lines
- Other?

"The primary usage of the Amateur Service frequencies is also treated in Part 97. This list should look familiar to you. These are the very topics about which you had to learn in order to pass the examinations for your license. Exchanging ideas on how to best operate an Amateur station would continue unchanged."

Slide

- Business
- Rule
- Prohibited transmissions

[Suggestions based upon Phil Karn, KA9Q letter to QEX and on ARRL.]

"No Amateur operator shall sell a communication service that uses Amateur Service frequencies.

"The control operator of an Amateur station may accept compensation for periods of time during which the station is transmitting."

- Morse practice

- Information bulletins
- Classroom instruction

"We have been talking with your representatives about the best way to codify a new rule. This suggestion is based upon a letter that appeared in your *QEX* magazine. It would simply state that 'No Amateur operator shall sell a communication service that uses Amateur Service frequencies.' The exception for WIAW to pay its control operators would continue. It adds the new exception that you want to include for classroom instruction.

"The quantity of secondary communications your systems could carry would be determined by several factors. For instance, the excess capacity of your systems in your specific locale would be an important factor. Providing communications for a race in Alaska is an entirely different situation than it would be if the race were held in a more densely populated area where more stations engage in Amateur communications.

"This approach may also help solve some of the problems you have been having in managing your high-speed automatically controlled systems. You would be able to transmit, on a secondary basis, the type of messages that gave rise to the unfortunate incident on your packet system earlier this year. 'I hope that you will give this suggestion your careful attention. You could be of great assistance to those in need of better communications, and properly implemented, this approach should have no adverse effect upon what you are now doing.' *[End of Haller Speech]*

COMMENTS FROM RAY KOWALSKI ON THIS PROPOSED PLAN

September 23, 1991
Mr. Fred Maia, Editor
W5YI Report

Dear Fred,
Although it is now nearly four years since I left the FCC, I still like to keep abreast of developments in the Amateur Radio Service. From time

to time since my departure for the private practice of law, I've been able to assist you and others who have retained my services in matters relating to ham radio.

I recently learned of a proposal that was floated by Ralph Haller, Chief of the FCC's Private Radio Bureau, at the ARRL National Convention in Saginaw, Michigan on August 24, 1991. Although I have not seen widespread discussion of this proposal, I, for one, view it with alarm. In my view, this proposal contains within it the seeds of destruction of the Amateur Radio Service as we know it.

So let me do what I can to get the dialogue going by telling you why I feel the way I do. Undoubtedly, this will be viewed by most of your readers as a contrarian position.

There presently exists in the Amateur Radio Service a tension among the principles that dictate the basis and purpose of the Amateur rules. These principles are stated in the very first Amateur rule, Section 97.1 of the FCC's rules. These principles declare that the Amateur Service is at once a hobby, a training ground, a medium of international goodwill, and a source of voluntary noncommercial communications, particularly emergency communications.

At times, the implementation of these principles results in conflicts among users as well as among the regulators themselves. This is why I say there is a tension among them. But it is a healthy tension, one that reflects the living and vibrant nature of Amateur Radio. The forces favoring one principle may be strengthened by events or fashions of the day, but they never get too far before the forces favoring the other principles combine to rein them in and keep the system in equilibrium.

Mr. Haller, however, has made a proposal that will upset the balance. If his proposal becomes law, the voluntary noncommercial communications component would be expanded. Based on my experience, both in and out of government, this

expanded component would quickly overwhelm the rest of Amateur Radio.

Mr. Haller has proposed that Amateur Radio frequencies, to the extent that they have excess capacity, be used to support non-Amateur communications on a secondary basis and without compensation.

Before I go much farther, let me say that Ralph Haller and I are well acquainted. We worked together for many years at the FCC. I believe I know Ralph and I believe he places great value on the Amateur Radio Service and its licensees. Thus I do not believe that he would deliberately make any suggestion that would not be in the best interests of the Service. In fact, I could almost believe he made this suggestion with tongue in cheek, as a way to show the incessant stream of petitioners for this or that exemption from the "no business communications" rule (Section 97.113) the logical outcome of their petitions. However, since he made the suggestion at an FCC Forum, I must conclude he is serious.

Mr. Haller envisions amending the Amateur rules to permit Amateurs to provide communications assistance to public safety agencies, charitable organizations, schools, news media, governmental agencies and others. Think of it: you could set up and run communications for parades and marathons; conduct club business; even order a pizza on your 2m autopatch, guilt free! As long as the communications made use of excess capacity on Amateur spectrum and did not interfere with the traditional hobby-type and emergency (i.e. disaster, safety of life, protection of property) communications and as long as you did not get paid for it, it would be legal.

Judging from the number of requests for waiver of the no-business communications rule I saw when I was at the FCC, I would have to say that this proposal would have a seductive allure for many Amateurs. Most Amateurs I have met are anxious to donate their time and

communications savvy to causes like those mentioned above. (Although some just get an emotional payoff out of playing the role of communicator.) So I don't have to tell you all of the good things that could come out of a proposal like this. But at what price? Like the Sirens' song, this proposal must be resisted, for in this most appealing direction lies shipwreck.

First, exactly what is "excess capacity?" I take the term to mean that the Amateurs have more spectrum than they can use for normal Amateur communications either now or in the foreseeable future. Mr. Haller has taken the existence of excess capacity as a given. Is this point conceded by the Amateur Community? If so, it is a dear price to pay in exchange for the weakening of the no-business communications rule.

The last time the FCC perceived that the Amateur Service had excess capacity, they removed 2 megahertz of that capacity in General Docket 87-14. Now it appears that the FCC is not even waiting for a spectrum re-allocation proceeding. Rather than moving the excess spectrum to other radio services, it will simply allow the incursion of outsiders into the Amateur Service. Believe me, Fred, once this camel's nose gets under the tent, there's no getting rid of it and there's no stopping the eventual appearance of the head, neck and shoulders.

And who are these outsiders? In almost every situation I can think of, they are groups who already have spectrum at their disposal. The federal government has so much spectrum, there are bills in Congress to pry out 200 megahertz of it and distribute it to non-government users. Local governments and public safety entities are eligible in their own land mobile services. Broadcasters and news media have their own relay frequencies. Even ordinary businesses have vast blocks of spectrum available.

So why is there so much demand to use Amateur frequencies? Because it's cheap to do, primarily.

Ham gear is as good as (if not better than) most land mobile equipment on the market. Yet it is available at a fraction of the cost. Also there are no pesky air time charges for using ham radio, the way there are with cellular calls. Finally, the licensing arrangements are more flexible: all you need is your "house ham" to provide the call sign and you're ready to go! These interests are only too willing to take advantage of the good nature and general willingness of hams to be of service whenever they can. They have found a way around a shortage of funds or an internal bureaucracy. The hams, for their part, think they are helping a worthy cause. But if you look deeper, you see that they are subsidizing an effort that could, if it needed to, provide its own communications.

Next, what about "secondary" communications? This is a term of art that means the communications may not cause harmful interference to communications that are "primary" in the band and are not protected from harmful interference from those primary communications. (See Section 2.104(d)(4) of the FCC's rules.) This is a nice concept, but it is difficult to enforce. As a practical matter, there are no communications police readily available to protect the rights of the primary communicators in any given instance. In other words, the protection of traditional Amateur communications achieved by relegating non-Amateur communications to secondary status is largely illusory. It is much like saying cellular communications are private, because there is a law against monitoring them.

Finally, let me see if I have this straight: the Amateurs would let everybody else use their frequencies, even for commercial, profitable purposes such as broadcasting, but what makes it legal is that the Amateurs will not receive any monetary compensation. I would make this deal every day for my land mobile clients, if I could! Spectrum is so scarce, we do not care where it

(Continued next page)

comes from or on what basis. And the price is right.

Undoubtedly many good causes will come forward in favor of Mr. Haller's idea. The problem is that there is no way to draw the line and allow only the "good causes" to take advantage of relaxed no-business communications rules. If one ham can coordinate a parade, then another ham can coordinate a professional golf tournament. If one ham can assist police patrols, another ham can coordinate plant security. If one ham can order a pizza on the way home from the kids' soccer game, another ham can check for messages on the way back from a sales call. In short, you cannot get just a little bit pregnant.

The flexibility already contained in rule Section 97.113 and the entire Subpart E of the FCC's rules, which is devoted to emergency communications, is already very broad. Parades, races, marathons and other public gatherings already have relief. So do swap meets and news

events. There is even an exemption for space shuttle communications. These rules are flexible enough to allow most of the worthwhile communications that hams are interested in providing. The wholesale abolition of the business barrier is as bad as the wholesale prohibition of business communications, which, as we can see, is not as strict as Mr. Haller makes it out to be.

Massive changes are afoot in the world of two-way communications. Mr. Haller's land mobile staff just initiated PR Docket 91-170, the so-called "spectrum reforming" proceeding, which has the potential to completely revise the land mobile communications regulatory framework in order to free up spectrum to support developing technologies. Do you think Mr. Haller's idea to use ham radio to support business communications is coincidence? Politically, this should be a time of spectrum vigilance for Trojan horse proposals. If there is excess capacity on the ham bands, the service

needs to fill that capacity with more hams, not business users. Because, Fred, there are more of them than there are of you. Think about it. Very truly yours,
Raymond A. Kowalski

THE W5YI REPORT

The W5YI Report is a 10-page biweekly newsletter. For more information or if you have Amateur Radio news to contribute to *The W5YI Report*, write Fred Maia, P.O. Box 565101, Dallas, TX 75356-5101, or call (817) 461-6443. Samples of *The W5YI Report* are available if you send a large SASE with 53 cents postage affixed.

While no guarantee is made, information is from sources believed to be reliable. Information in this column may be reproduced providing credit is given to *The W5YI Report*.

WHAT CALL WILL I GET?

A list of call letters is issued by the FCC on the first of each month which details the last calls issued for the previous period. As an example, the list shown at right are calls issued up to August 1, 1991. By tracking the progression of calls for your district, you can closely estimate what call you will get.

(*) All 2-by-1 "W" prefixed call signs have been assigned in every radio district except the 1st and 3rd call sign area. Two-by-2 format call signs from the AA-AK block are assigned to Extra Class Amateurs when 2-by-1 signs run out. Note that AL prefixes are assigned to Alaska and AM-AZ prefixes are assigned to other countries by the International Telecommunications Union (ITU) in Geneva, Switzerland.

(**) All Group A (2-by-1) format call signs have been assigned in Hawaii, Alaska and Puerto Rico. Group B (2-by-2) format call signs are assigned to Extra Class when Group A are depleted.

AMATEUR RADIO CALL SIGNS

District	Group A <i>Extra</i>	Group B <i>Advanced</i>	Group C <i>Tech/Gen</i>	Group D <i>Novice</i>
Ø (*)	AAØGD	KFØUI	NØPMG	KBØJOH
1	WW1O	KD1DT	N1KEW	KA1ZHM
2 (*)	AA2GP	KF2EK	N2AOC	KB2NQM
3	WR3V	KD3YY	N3KOS	KA3ZKK
4 (*)	AC4JV	KO4KJ	(**)	KD4FGV
5 (*)	AB5BF	KI5UD	N5WLT	KB5QKB
6 (*)	AB6FQ	KM6JC	(**)	KD6BCK
7 (*)	AA7KO	KG7UM	N7UDT	KB7ODE
8 (*)	AA8FA	KF8PR	N8QFO	KB8NBD
9 (*)	AA9BW	KF9FW	N9MSH	KB9HGI
Hawaii	(**)	AH6LK	WH6CP	WH6COI
Alaska	(**)	AL7NN	NL7ZJ	WL7CCX
Virgin Islands	NP2S	KP2BZ	NP2ER	WP2AHL
Puerto Rico	(**)	KP4SK	(**)	WP4KNN

(**) Group C (primarily 1-by-3) call signs have now run out in the 4th, 6th and Puerto Rico call districts. According to the rules (adopted by the Commission Feb. 8, 1978, Docket No. 21135), Technician/General Class Amateurs are next assigned D (2-by-3) call signs when all from Group C have been assigned. Upgrading Novices holding a 2-by-3 format call sign in the 4th, 6th and Puerto Rico call areas will no longer be

able to request a Group C call and will be automatically assigned *another* more recent 2-by-3 format call sign if they do. Contrary to the wishes of many Amateurs, the FCC has said they will *not* be going back and reassigning unused "K" and "W" 1-by-3 format call signs. (Source: *W5YI Report* and FCC Licensing Facility, Gettysburg, Pennsylvania.)

Dan & Burke



A Tornado Provides An Interesting Experiment

A few minutes ago Dan had dropped into the basement laboratory and thrown himself down on the workbench while he chatted with Burke who was stretched out on the battered old couch across the room. Suddenly Burke became silent and heaved himself to a sitting position.

"Say," he said, trying to sit quietly so the couch springs would stop their squeaking protest, "do you hear music?"

"Music?" Dan repeated in wide-eyed surprise. "What's the matter with you, old buddy? Chill out!"

"I hear music," Burke stubbornly insisted as he got up and padded around the room, checking the receivers, stereo amplifier, CD player, and similar equipment strewn about the room. Every few steps he stopped to listen intently. "It seems to be louder over here by the bench," he observed. "Hey! It's coming out of you!" He exclaimed and began to frisk him in the professional manner of a detective on "Law and Order."

"Get your paws off me!" Dan shouted as he planted a big foot in the middle of Burke's chest and shoved him across the room to a sitting position on the couch. "If



you must know, this is what you've been hearing," he said as he unbuttoned his shirt pocket and slipped out an object not much larger than a ballpoint pen. He turned a small knurled knob on the end of the "pen," and the whisper of music rose to a volume that filled the room.

"Hey!" Burke exclaimed with mounting enthusiasm, "I'll bet that's one of those new Sony radios I read about in *USA Today*."

"Right!" Dan proudly admitted. "You're feasting your blue eyes on the world's tiniest radio on the commercial market. This is a real superhet with a built-in loop antenna, two IF stages, and even automatic volume control. There are no transistors in it. Just one integrated circuit takes their place."

"I know all that," Burke interrupted, "but how well does it work?"

"What station do you want to hear?" Dan asked confidently.

"Try Chicago; that's a hundred and twenty miles away."

Dan moved another little dial at the top of the "pen," and one after another five Chicago stations were picked up with ample volume. "And just for good measure, here's Cincinnati, a couple of hundred miles away," he said as WLW rolled in strong and clear.

"Cool," Burke marvelled, "that's pretty 'far out' reception for the middle of the day, and I mean far out. It changes my thinking about those new single-chip receivers that are coming on the market. Before hearing this one, I thought they were just toys. You know, a sort of glorified crystal set that would pick up strong local stations and not much else."

"You ain't heard nothin' yet," Dan boasted. "This little Sony

came yesterday from my uncle in New York. It comes with a hearing-aid type earphone that plugs into this little hole in the side of the case. When it's plugged in, the tiny speaker is disconnected. Last night after I went to bed I was using the earphone to do some DX-ing. It must have been a hot night on the broadcast band. New York, Atlanta, New Orleans, and Dallas rolled in like our local station. But I was really blown away when I picked up two stations in Mexico City. I stayed with them until they announced their call letters, just to be sure. It made me feel kind of funny to be sitting there in the middle of the bed, holding a complete receiver between my fingers. I was hearing Spanish commercials from 2500 miles away whooping it up for Coca-Cola. It's really radical when you realize that the antenna is no bigger than a toothpick."

"If I remember right," Burke mused, "that set draws less than a milliampere for a button battery. Let's see...that's .001 amperes times 1.2 volts. Wow! That's 2500 miles on something less than a thousandth of a watt of power consumption. That's pretty good mileage. Say, we could put on a real mind-reading act with that thing. You could wear the ear-

phone under a turban, and I could go out in the audience with a small concealed transmitter. Then you could hear and answer the questions people whispered to me. We gotta work on that."

"Okay," Dan agreed, "but that's not really what I came over to talk about. Get a load of that static. It's building up so bad on 75 meters that I had to QRT on a QSO I was having with N8POV over in Worthington. Bill is interested in weather forecasting and was telling me about tornado static. He said that for several years he's been able to tell whenever there's a tornado within three or four hundred miles just by listening to his receiver. Bill maintains that when a tornado is doing its stuff, it makes a peculiar kind of static. Instead of individual crashes, he describes it as being sort of a continuous noise, like the sound of loose gravel falling on a tin roof."

"And he's right!" Burke exclaimed. "That fits in with an article I was reading in *USA Today*. A professor at Texas A&M has been studying tornado static. He calls those high-voltage lightning discharges sferics, from

the word atmospherics. As a storm increases in intensity, the frequency of the discharges increases. The number of sferics that take place in any second can be used as a guide as to whether or not a tornado is in the thunderstorm. Fifteen strokes a second indicates hail and that the storm is building toward a tornado. Twenty-three strokes per second means tornado activity is going on and when twenty-six strokes are recorded, the tornado has been spawned."

"How did he count the strokes?" Dan asked.

"By displaying the lightning discharge on an oscilloscope and taking a picture with an automatic camera every time there was a lightning stroke. At the same time, another camera took a picture of a radarscope that showed where the storm center was located. With this gadget going twenty-four hours a day, all the professor had to do was to wait until a cyclone passed near the radar station and then look at the pictures when the tornado was in business. In Texas, sometimes you don't have to wait too long! He has taken some dandy pictures. One funnel was obliging enough to start forming right over the station!"

"He found that not only the number of strokes were important, but also their nature. A tornado turns out a large percentage of high-frequency sferics with scope pictures altogether different from the low-frequency patterns seen during an ordinary thunderstorm. These high-frequency jobs appear only when there is tornado activity—Hey! You're not listening to me."

"I was just thinking," Dan said slowly. "Isn't a thunderstorm a comparatively small-diameter affair?"

"Yes, but what do you have in mind?"

"Did you ever notice that when a thunderstorm is coming on you can see the effect of each lightning stroke as lines across a TV screen?"



"Sure."

"Well, why couldn't we use the directional characteristics of your Yagi TV antenna? By using your antenna rotating motor you could get a rough idea of the location of a storm and the direction in which it was moving."

"Hmmm," Burke said with a thoughtful frown on his round face, "I can't seem to think of any good reason why that wouldn't work. Let's try it."

In a couple of minutes the boys were upstairs and had Burke's TV set going. The volume was turned down to quiet the noise and the receiver was set to a blank channel as Burke swung the antenna about with the rotator.

"You get the best lines when you're aiming south," Dan observed, "but that's about all you can tell. The front receiving lobe is too wide to do any directional pin-pointing."

"Let's try turning the antenna broadside to the storm," Burke suggested. "*A Yagi antenna has very sharp nulls off the sides. We'll adjust it for minimal noise reception with one side pointed in the general direction of south.*"

"Hey, now you're in business!" Dan exclaimed. "There are just two short periods of time as the antenna swings around when the lines almost go away."

"Let's see now," Burke said. "Our antenna indicator says the antenna is pointing about ten degrees north of due east. That should mean the side of the antenna we're interested in is pointing about ten degrees to the east of south. That would put the storm center somewhere along a line from here through a point a little to the east of Indianapolis—"

"Listen!" Dan interrupted as he suddenly noticed the little transistor receiver buzzing away in his shirt pocket. The crashes of static it had been giving off suddenly merged into a continuous roar that sounded very much like the interference created by an old-fashioned electric razor or a food

mixer. "Golly!" He exclaimed, "That sounds exactly like the kind of static Bill was telling me about."

"Can you get any broadcast stations?" Burke asked.

Dan moved the little dial to the frequency of the local broadcast station. It came in clearly with only an occasional weak scratch-sound heard under the powerful signal. Burke returned to his rotator control and found that now the continuous lines across the face of the TV screen made it comparatively easy to find a very sharp null; but he also noticed he had to keep nudging the antenna to the north to maintain the null.

"That storm must be moving to the east," he remarked over his shoulder to Dan, only to find that he was no longer standing there. "What are you doing over there at the window?" He demanded as he caught sight of Dan holding the curtains aside and peering out to the south.

"Well, it's like this," Dan drawled, "tracking tornados is all well and good, but I just want to be sure the tracks don't get too fresh. If I see anything out there that looks the least bit like a funnel-shaped cloud, I'm going to break the sound barrier getting back into that basement. Just don't get in my way."

"Bill has your imagination all fired up," Burke scoffed, "we've just been hearing a bad thunderstorm. Even that seems to be subsiding. I notice the buzzing noise is quieting down in the TV set and all I hear are isolated crashes of static again—"

He was interrupted by the announcer breaking in on the Madonna song that was playing on Dan's transistor receiver: "We interrupt this program to bring you a special bulletin. A small tornado has just been reported by a pilot flying near Indianapolis.

The tornado was first sighted about eight miles due east of that city and was travelling in an east-northeasterly direction. The funnel was clearing the earth by an estimated five hundred feet. The pilot observed no damage in its wake. After a few minutes it disintegrated and was not seen to reform. Keep tuned to this station for further news as it develops. Now let's zoom back to the blond barracuda," the announcer bellowed.

"Awesome" Burke breathed, "that was a tornado we heard."

"Well, we've learned two things," Burke remarked as he switched off the TV set and pulled the line cord from the wall. He always disconnected his ham gear when there was the danger of a thunderstorm. "First, a TV set and an antenna rotator can be used to determine the general direction and progress of a thunderstorm or tornado. Secondly, a tornado does put out a special kind of static that is easy to recognize once you've heard the sound." "Let's hear it for science!" Both boys said in unison. □

DAN AND BURKE is based on a storyline created in 1954 by John Frye, W9EGV. The boys are the sons of John's original characters, Carl and Jerry.

John Fry is no longer with us. But while he was alive, John was an avid Amateur Radio operator who wrote about young people—for young people.

It's doubtful that anyone could make John's stories more interesting or improve on his words. We'll settle for a 1990's twist.

If you would like to learn more about becoming an amateur, write to the National Amateur Radio Association, 16541 Redmond Way, Suite 232, Redmond, WA 98052 or call 1-800-GOT-2-HAM (1-800-468-2425).

Changing Amateur Radio

BY RON EARL, W6TXK

There are a number of changes that need to be made to make Amateur Radio easier

to market to young people:

Equipment—The current offerings by manufacturers are just too expensive. They cater to the retired ham and to those that are older and can afford the expensive equipment. Manufacturers need to provide equipment that a young person can talk their non-ham parents into purchasing as a first rig. While used equipment is readily available and at a reasonable price, an inexperienced ham could have a bad experience. That would discourage the youngster and the parents from pursuing the ham radio hobby. I would say a two-meter radio at \$150 and an HF radio (more than one band, CW/SSB and not QRP) at \$275 would be sufficient. Ramsey Electronics does have a two-meter radio that fits the price requirements, but I am not sure that it is as easy as a Heath to build. *[It is close—Ramsey has done a good job—Ed.]*

Testing—In general, the test material is appropriate to the privileges one receives. The Novice test I took in 1959 covered much less material, but I could only operate CW and two-meter AM. Also, the exact test questions were not published. The biggest objection I have to the current tests is that the questions need to be restated without the technical jargon. Are we trying to have some understanding of the material or just memorization? The FCC rewrote the rules in simpler terms. Why not rewrite the test questions for the Novice, Techni-

cian and General Class licenses? Even the youngest can understand the material if it is related to them in simple terms. My 7- and 9-year-old have their licenses and my toughest problem was explaining the technical words, not the concepts.

Support for New Amateurs—My kids have had their licenses since July. They received no welcome letter from the ARRL, no sample magazine copies, nor mail for QSL cards. While we usually don't welcome junk mail, I can remember my excitement when I first received my license, letters, advertisements, and QSL samples. All sorts of stuff was mailed to me, even before I received my license! Are the Amateur Radio

suppliers interested in new business?

Getting Them On The Air—We are in an age that has an incredible amount and variety of Amateur Radio classes offered. In many cases the time commitment for a class is just one weekend. These classes are a great opportunity for the new Amateur to meet other Amateur operators in their community. Support networks for the new ham are important. Unless they know someone, new Amateurs might fall by the wayside. The key lies within the clubs. The ARRL should be introducing itself and ARRL-affiliated clubs to all prospective Amateurs within one month after they receive a license. For those of us teaching classes, we should never enter an area to teach a class without handing out a list of clubs in the area where students can get help after the class is over.

These are just a few of my ideas.
73, Ron Earl, W6TXK

MacHam™ OUTSTANDING TESTING SOFTWARE FOR MAC OWNERS

Since the introduction of *The Ham Radio Handbook*, Apple Macintosh owners have been asking for license testing software that will run on their machines. NARA is pleased to announce the introduction of MacHam for the new no-code Technician license, clearly one of the most elegant and useful Amateur radio programs ever written for the "Mac." And, it's a perfect companion for *The Ham Radio Handbook*.

Because of the superb Mac graphics, all required circuit diagrams are displayed with the question right on the screen. If the test is printed, the diagrams are included.

The flexibility for training is excellent. The tests can be taken on screen, by element or by chapter, with options of immediate or end-test scoring. Printouts, of interest to VE's, create exact VE style exams, with pool question

numbers, correct answer key and blank answer sheets as desired.

One of the most unique aspects is the glossary of needed radio terms that are included online. If you don't understand a word, you simply look it up!

You'll get quite a surprise when the program loads. Not only is there a picture of a rotary beam, the sound plays the "Fifth Symphony" (you know the one where the whole orchestra goes di-di-di-dah).

MacHam is available *directly from NARA* and is priced at \$34.95 (\$2.00 S&H) by itself or \$49.95 (\$3.00 S&H) when included in the Education Package rather than IBM software. MacHam was developed by Richard Coyne and is a product of the Coyne Software Group.

"W8FEH Out!"

Dodging a Tornado

BY WILLIAM F. BLINN, N8POV

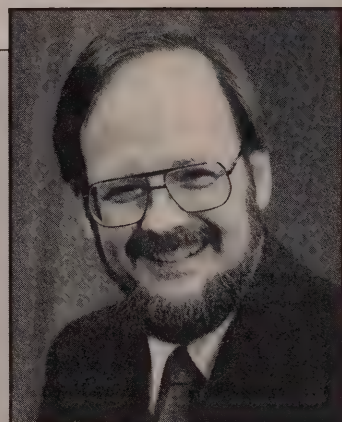
Central Ohio Weather Net control operator Stew Banks abruptly ends a weather spotter's report. Stew is a friendly guy; outgoing and talkative most of the time; but not now.

A late-afternoon thunderstorm with towering cumulus clouds brought high winds and hail. Some trees and power lines are down, but now the sky is clearing, and people are getting back to what they were doing before the storm.

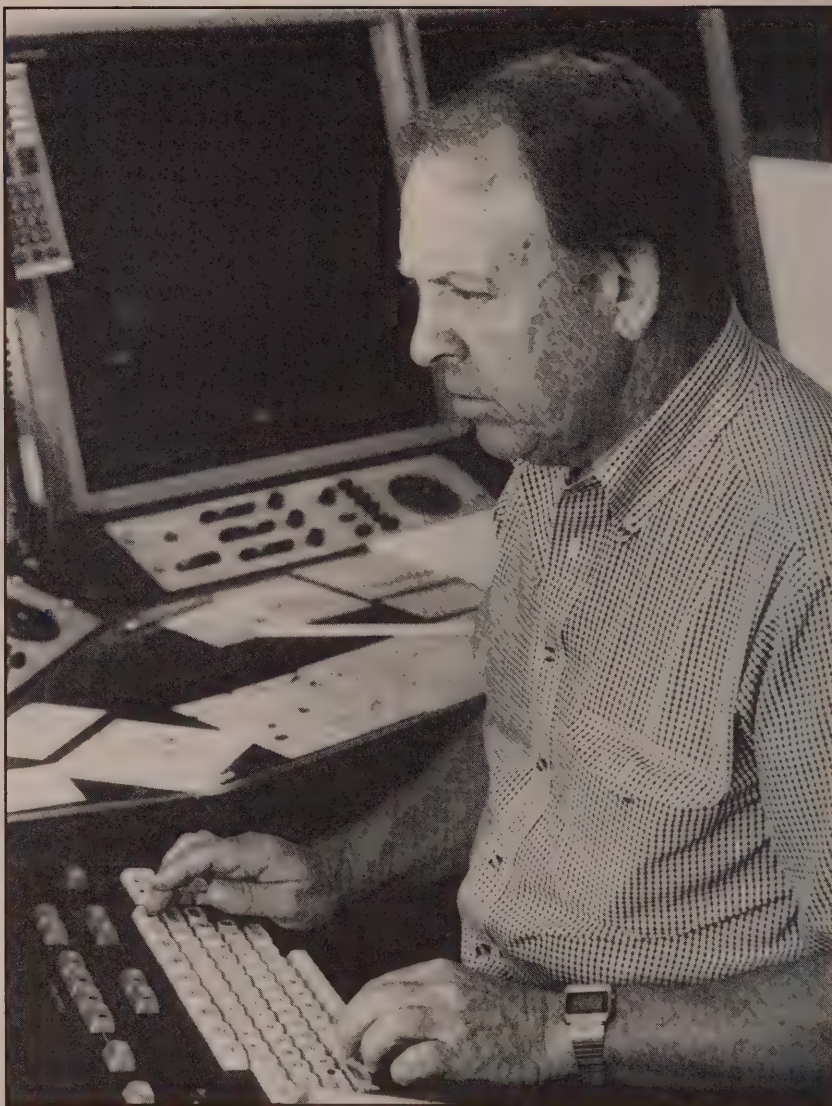
So why is the weather net still in a state of high alert? Because tornadoes are most likely to form on the trailing edge of a storm—particularly a storm such as the one that just ended. Terse reports from spotters crackle across the repeater, answered by brief responses from net control. Any attempt at casual conversation is met with an abrupt, "W8FEH out."

"We're short with them and we want them to be short with us," says Steve Robeano, another of the Central Ohio Weather Net's 12 control operators. Keeping the net clear is the best way to insure an emergency message will get through.

Given enough warning, the weather net begins operating early, almost informally. There may be chit-chat. Even an occasional sunshine report is tolerated. But it is



William F. Blinn, N8POV



Meteorologist-in-Charge Lew Ramey sends a tornado warning based on sightings from Amateur Radio operators who reported what they saw

on the Severe Weather Net. "Hams don't get anywhere near the credit they deserve," says Ramey.



all business by the time bad weather arrives.

Two spotters on the west side of town have reported a wall cloud, another ominous sign; one sees what might be rotation. Robeano tells the spotter to watch it closely, keep the net informed, and to be careful. Mac McCarty marks the spotter's location on a map. Stew Banks notes the contact in a log.

Ten feet away, in a room with exceptionally thick walls, meteorologist in charge Lew Ramey listens to the exchange as he aims the weather station's radar west. Says Ramey, "Amateur Radio weather spotters are eyes and ears where we need them most." Weather radar shows only precipitation, not cloud formations. "We can't see a tornado on radar, so the spotters are an invaluable asset."

The area has been under a tornado watch for the past hour and Ramey has already prepared the tornado warning message; just in case. Warnings are part science,

part judgement call. The National Weather Service does not issue warnings indiscriminately—the threat must be real. On the other hand, Ramey must be decisive and issue them without delay when conditions warrant. The irony is that the greatest danger of death and injury occurs at precisely the time most people think it is safe; when the sky clears following a storm.

"Weather net stand by for additional information," Robeano barks into the microphone. He has observed Ramey begin the process that will send a tornado warning to the news media and law enforcement agencies, but he delays putting the word on the weather net until the warning is issued officially.

Seconds later the warning is on Associated Press and United Press International printers in the city's radio and television stations. Without exception, they break into programs to alert the public. NOAA Weather Radio broadcasts alert tones, and Civil Defense officials

"Amateur Radio operators give us the eyes and ears where we need them," says Meteorologist-in-Charge Lew Ramey. The radar Ramey is watching shows rain, but not clouds. You can't see a tornado on radar.

turn on sirens. The warning reaches police and sheriff's departments through the Law Enforcement Automated Data System (LEADS).

This flurry of activity has a single purpose: saving lives. Severe, possibly deadly weather threatens the area. A tornado warning from the National Weather Service means a tornado has already developed. Typically, the warning covers a small area; often just part of a county.

HOW THE SEVERE WEATHER NET WORKS

The Central Ohio Weather Net consists of 10 to 12 control operators and more than 500 spotters in 16 counties. All net equipment is donated, as is everyone's time. The

TORNADO!

control operators even pay for beepers so that the National Weather Service can reach them quickly.

Obviously, these volunteers cannot stop tornados or make them go around an area, but they can save precious seconds by giving NWS meteorologists information they need to issue timely warnings. Because spotters are located throughout an area, they are also in a unique position to call for help if the worst happens.

"The best thing we can have during severe weather is somebody sitting under the storm and telling us what's happening," says meteorologist Ramey. "If we see something on radar 40 miles west of us, we can have a spotter on the ground 35 miles west of us describe it—or someone on the back side can say what it looks like from there. Combine these reports and we have the best possible data."

A spotter in a northwest suburb reports the wall cloud's continuing approach, definite rotation, and then suddenly the descent of a small funnel. It touches down behind a school, uproots a few small trees, yanks off a roof, and disappears as quickly as it arrived.

TRAINED OBSERVERS ARE ESSENTIAL

What does it take for the NWS to issue a warning based on information from an Amateur Radio weather spotter? "We generally won't issue a warning based on information from one spotter," Ramey notes, "unless we know he or she is trained and routinely provides accurate reports." Although NWS meteorologists train spotters, a new volunteer, and occasionally a veteran, sometimes react more to adrenalin than weather. Ramey's best advice is, "Report what you see, but remember that tornados hardly ever develop on the leading edge of a thunderstorm."

"We started getting reports of funnel-shaped clouds before the thunderstorm even arrived," says meteorologist Ramey. The sky was full of ugly, but harmless clouds,

and there were some shafts of heavy rain. Questionable reports sometime come from Amateur Radio weather spotters, but they are usually from the public.

"The greatest problem weather nets face," says Stew Banks, "is dealing with questionable reports."

Most weather stations have someone who will train weather spotters, often travelling far from the weather station to do it. Ramey visits most of the counties in his jurisdiction every year and conducts 20 to 25 training sessions between the beginning of spring and early summer.

The wall cloud continues moving east, still showing some rotation. Eventually it dissipates without doing any additional damage. We were lucky this time. There were no deaths or injuries.

As the threat subsides, the weather net begins to relax. Control operators thank spotters for their help. Robeano, Banks, and McCarty close the weather net, and store the maps.

They also turn off the tape recorder that has captured every word for the past several hours. Recording the net gives control operators a way to critique the system's operation.

"We think we do a pretty good job," says Robeano, "but we listen

to the tapes to identify the things we can do to improve."

The National Weather Service has a video tape that is designed to show weather spotters what to look for, and what might fool them. It is available for loan to clubs or groups. Some stations will even make copies if you provide the tape for use by church groups, clubs, or other organizations.

"Hams use the tape to get people interested in the weather spotter program," says Ramey, "and to bring more people into Amateur Radio."

The National Weather Service offers Amateur Radio operators a booklet called *Spotter's Guide for Identifying and Reporting Severe Local Storms*. It is available from your local weather bureau or the U.S. Department of Commerce, NOAA, Rockville, Maryland 20852.

If you are not involved with a weather net in your area, now is a good time to look into it. The Weather Service office probably can give you the net manager's name and phone number.

If you are looking for a way to help your community, and to give Amateur Radio a higher profile in the community, joining the weather net is a good start. Who knows? Someday your report might be the one responsible for saving lives. □

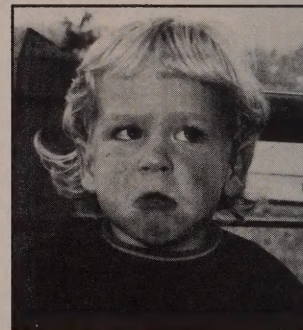
Grandpa Won't Let Me Have A Puppy!

He says dogs eat too much and their shots are 'spensive. Mom says he's a tightwad and shaves his head so he don't need haircuts. But I love him anyway! Grandpa Stoner publishes *The Amateur Radio Communicator*. Maybe if you sent him some money for a perscription, and said Cameron ask you to, he'd get me a puppy. Could you perscribe for two years 'cause a puppy needs a red wagon to pull?

**Stoner, You Cheap Miser,
Get the Kid a Puppy!
Here's My Subscription.**

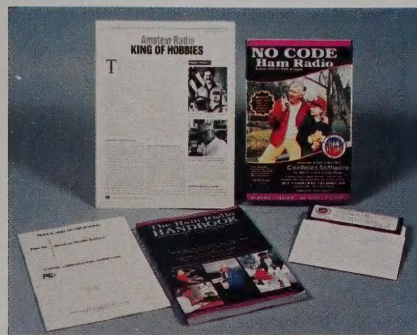
- ☐ Send it for one year. Here's my \$10.00
☐ Get him a wagon too. Here's my \$18.00 for two years.

Name _____ Call _____
 Address _____
 City _____ State _____ ZIP _____
 Credit Card _____ Expires _____



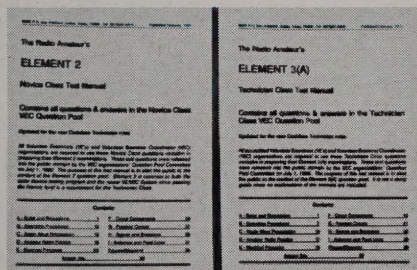
NARA 16541 Redmond Way, Suite 232, Redmond, WA 98052 • Call Toll Free 1-800-GOT-2-HAM

AVAILABLE FROM NARA



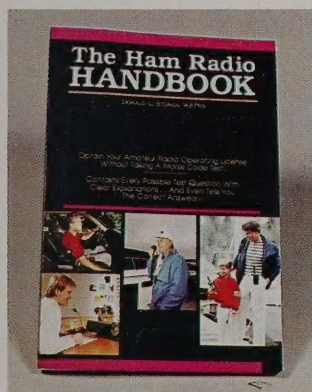
Pass The New Codeless Technician Test!

The **NARA Educational Package** from the National Amateur Radio Association includes: *The Ham Radio Handbook*; 5.25" IBM compatible software for testing your knowledge; a complete list of Contact Volunteer Examiners; the FCC Rules and Regulations for Ham Radio and *Amateur Radio—King of Hobbies*, a publication explaining what Amateur Radio is all about. The **NARA Educational Package** is just \$29.95 (\$3.00 S&H).



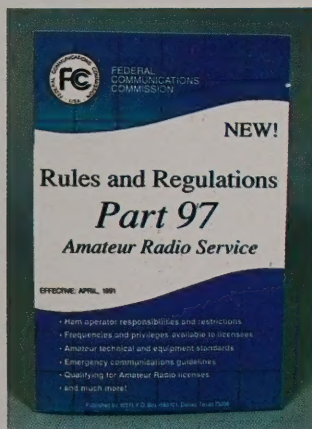
The FCC Question Pools

Each booklet contains all the questions and answers for each license class. Does not contain any explanations. Order by license class \$3.00 each (\$1.00 S&H) or order the Novice and Technician together (all the questions for the new code-free Technician class license) for \$4.95 (\$1.50 S&H).



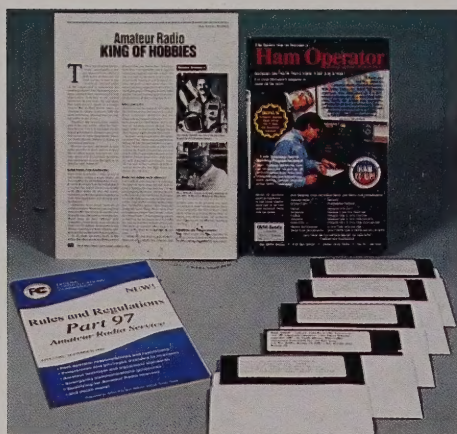
The Ham Radio Handbook

The leading book for anyone wishing to earn the new code-free Technician license. Includes every question you might be asked during a test session, plus the four multiple choice answers. *The Ham Radio Handbook* is the only test manual that explains in detail why the correct answer is correct. Includes simple and easy-to-understand theory along with many photos and drawings. The book divides the test questions by subelement, devoting a chapter to each. The appropriate test questions and answers are given at the end of each chapter. The list of correct answers is included at the end of the book. Guaranteed to provide all the information needed to get your ham radio license. *The Ham Radio Handbook* is only \$9.95 (\$2.00 S&H).



The Rules of the Road

It took the Federal Communications Commission nearly two years to completely overhaul the Amateur Radio Service Rules to reflect current technology and Amateur operations. The FCC also deleted many unnecessary, obsolete, and redundant rule provisions.



Taking a Ham Radio Test?

This amazing collection includes self-testing programs for every license class. Study all 1,931 questions by license class and supplement. The software covers the Novice, Technician, General, Advanced, and Amateur Extra on four separate disks. Each disk includes every possible test question and four multiple-choice answers for each one. You can take sample ham tests right at your IBM compatible keyboard by selecting the correct answer or print out tests just like you will be given during a testing session. Prompts you if the answer is incorrect and tabulates your score both in numbers and percentage correct. This is the definitive work for anyone wanting to go "all the way." The **Ham Operator Package** also includes a copy of Part 97 of the Rules and Regulations, and a copy of *Amateur Radio—King of Hobbies*. The **Ham Operator Package** is only \$29.95 (\$3.00 S&H).

Having Trouble with Code?

The **Morse Academy** software actually teaches all 43 required code characters and then steps you up through the Amateur Extra 20-wpm level using sophisticated computer aided instruction techniques. Adjustable tone, standard or Farnsworth spacing. Sends text or random generated characters—even properly constructed code exams. Many features—plus a 40-page on-disk manual! \$14.95 (\$1.50 S&H).

For the fastest service, call NARA at 1-800-GOT-2-HAM (1-800-468-2426)

National Amateur Radio Association
16541 Redmond Way, Suite 232
Redmond, WA 98052

Form of Payment MC ☐ VISA ☐ Check ☐
(Please Print)

Name

Call

Address

City

State ZIP

MC/VISA Expires

Signature

Qty.	Title	Price	S&H	Total
<input type="checkbox"/>	Ham Radio Handbook	9.95	2.00	
<input type="checkbox"/>	NARA Educational Package	29.95	3.00	
<input type="checkbox"/>	Ham Operator Package	29.95	3.00	
<input type="checkbox"/>	Morse Academy	14.95	1.50	
<input type="checkbox"/>	Rules and Regulations Part 97	4.95	1.00	
<input type="checkbox"/>	FCC Question Pools			
<input type="checkbox"/>	Novice/Technician	4.95	1.50	
<input type="checkbox"/>	General	3.00	1.00	
<input type="checkbox"/>	Advanced	3.00	1.00	
<input type="checkbox"/>	Extra	3.00	1.00	
	Washington residents add 8.2% tax			
	Total Enclosed			

Please make your check or money order made payable to: **National Amateur Radio Association**

Order Today!

Join the National Amateur Radio Association

and receive your monthly issue of

The Amateur Radio Communicator!

Who Reads The Amateur Radio Communicator?

- Anyone interested in obtaining an Amateur Radio license
- New Amateur Radio operators
- Public and private school teachers who want to introduce their students to Amateur Radio
- Amateurs who are now, or want to become, ham radio instructors
- VE's (volunteer license examiners) who administer the Amateur Radio exams
- Amateurs concerned about the future of the Amateur Radio Service

What Will You Gain When You Join NARA and Receive the Communicator?

- 1 You'll get the latest facts on what's happening in Amateur Radio
- 2 The knowledge to help you get the most from the Amateur Radio Service
- 3 You'll be helping to insure a solid future for the Amateur Radio Service

This means an exciting future for you as an Amateur Radio operator!

Here's What You'll Find in the Communicator!

Each month, the *Communicator* will include clear and informative articles on topics such as:

- Passing the Amateur Technician Class exam
- Erecting your first antenna
- Different types of Amateur communications
- Getting materials for your radio classes
- Classroom demonstration techniques
- Obtaining commercial support for your classes
- Keeping your students motivated
- Publicizing your Amateur Radio class
- The latest details on rules and regulations
- Up-to-date information on the VE program
- The latest news on proposed changes to the Amateur Radio Service
- Repercussions that regulation changes will have on the future of Amateur Radio

NARA publishes the only non-commercial ham magazine that addresses these subjects in a simple-to-understand manner.

What's NARA Doing?

The goals of NARA are to:

- Get more people licensed in the Amateur Service.
- Save the various Amateur bands (frequency ranges) from confiscation by commercial interests.

▶ In the past year, Amateur Radio has lost part of the 220-MHz band and, in some areas of the country, is in the process of *losing access* to another band (900 MHz).

NARA is striving to get more people involved in the Amateur Service so we can increase activity and retain our remaining Amateur bands.

When you join NARA, your membership dollars will be used to *further these goals*. Let's face it—with a subscription cost of only \$10.00 per year, *you won't find a better value in Amateur Radio!!* Join today! It's easy. Just complete the subscription form below and mail your check or money order. For the fastest service, call 1-800-GOT-2-HAM (1-800-468-2426) with your Visa or MasterCard number.

Yes!



NARA

NATIONAL AMATEUR RADIO ASSOCIATION

16541 Redmond Way, Suite 232-P
Redmond, WA 98052

I want to join NARA and receive my monthly copy of *The Amateur Radio Communicator*.

- ☐ One year (with 12 issues) for \$10.00
- ☐ Two years (with 24 issues) for \$18.00
- ☐ Three years (with 36 issues) for \$25.00

(Please print)

Form of Payment MC ☐ VISA ☐ Check ☐

Name Call

Address

City

State ZIP

MC/VISA Exp

Signature

Please make your check or money order made payable to:
National Amateur Radio Association



NARA

NATIONAL AMATEUR RADIO ASSOCIATION

16541 Redmond Way, Suite 232
Redmond, WA 98052

NONPROFIT ORG.
U.S. POSTAGE PAID
DALLAS, TX
PERMIT NO. 4258

MEMBER#1059 LAST: June 93

J. A. Maxwell

P. O. Box 473

Redwood Estates CA 95044